FIG.1

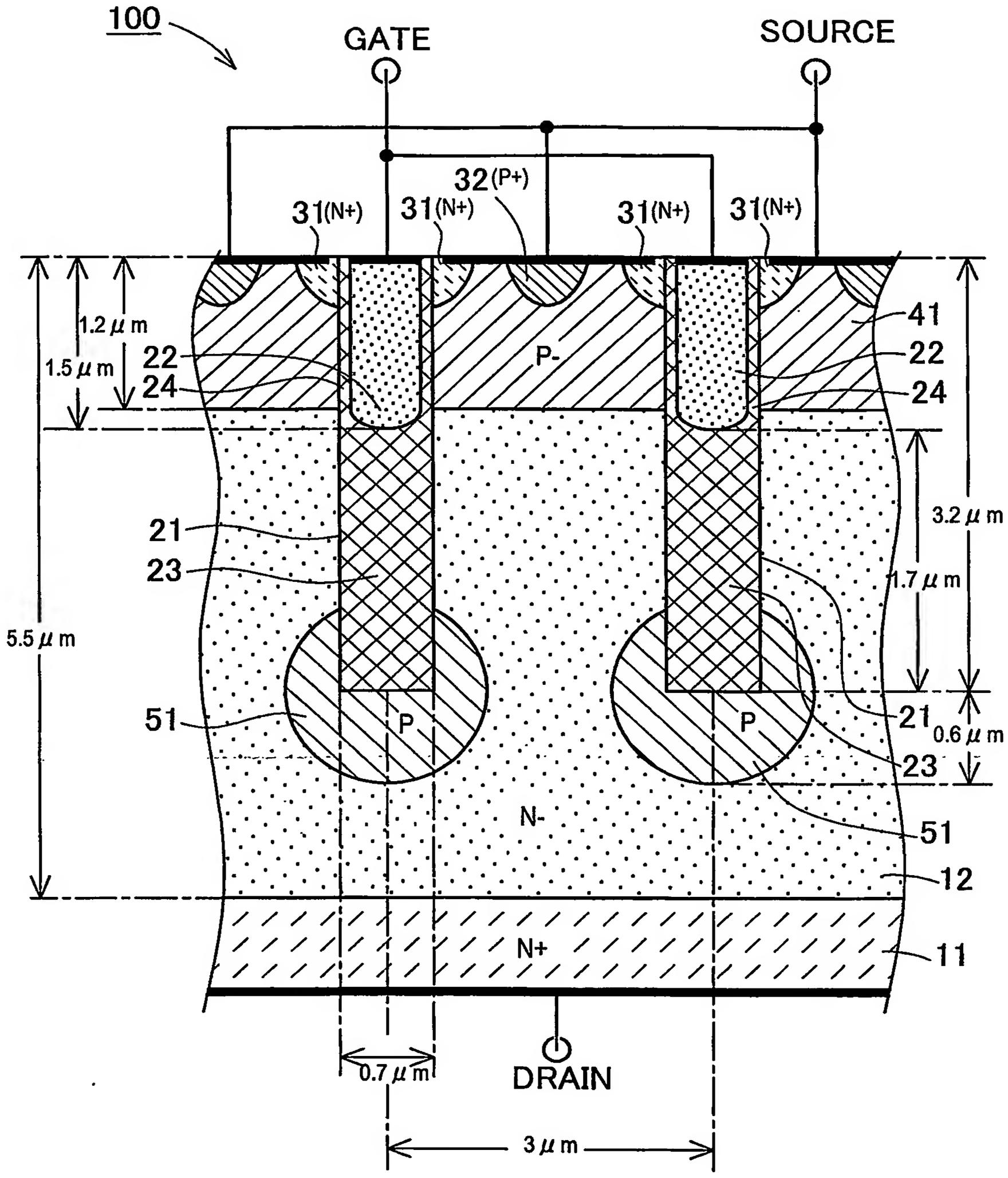

100
GATE
SOURCE
31(N+)
31(N+)
32(P+)
31(N+)
31(N+)
1.2 μm
1.5 μm
22
24
P-
41
22
24
21
23
5.5 μm
3.2 μm
1.7 μm
51
P
P
21
0.6 μm
23
N-
51
12
N+
11
0.7 μm
DRAIN
3 μm

FIG.2

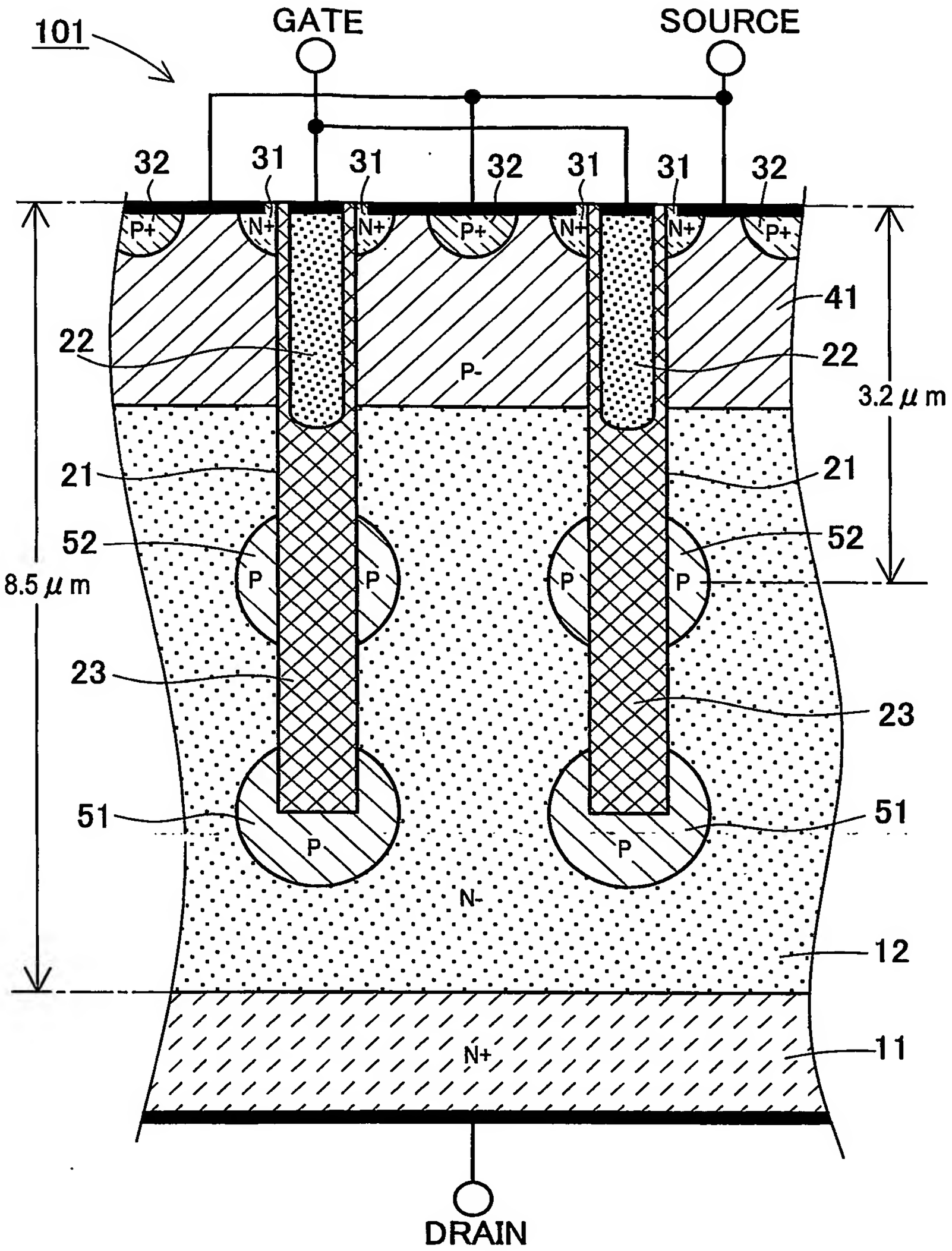

101
GATE
SOURCE
32
31
31
32
31
31
32
P+
N+
N+
P+
N+
N+
P+
41
22
22
P-
3.2 μ m
21
21
52
52
8.5 μ m
P
P
P
P
23
23
51
51
P
P
N-
12
N+
11
DRAIN

FIG.3

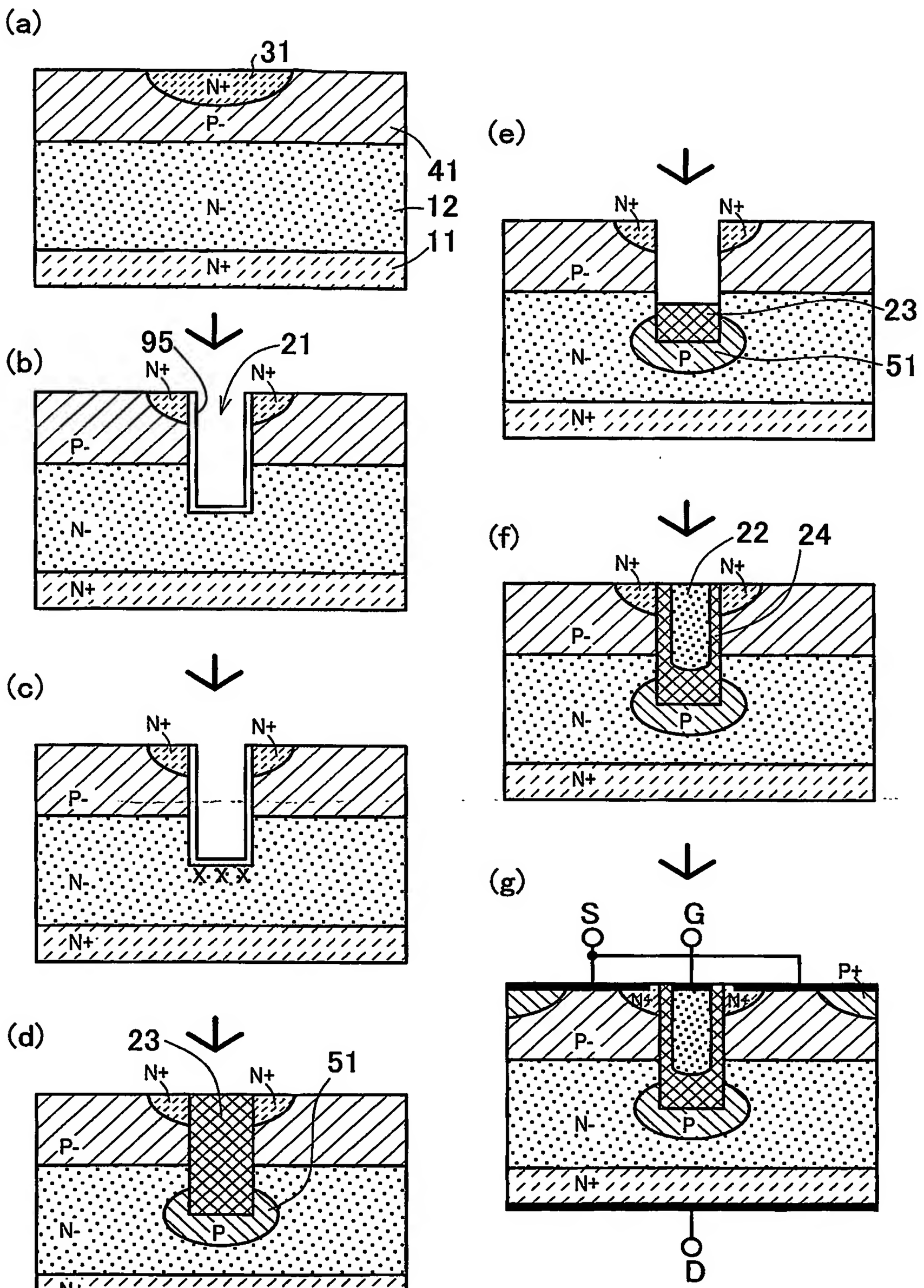

(a)
31
N+
P-
41
N-
12
11
N+
(b)
95
21
N+
N+
P-
N-
N+
(c)
N+
N+
P-
N-
X X X
N+
(d)
23
51
N+
N+
P-
N-
P
N+
(e)
N+
N+
P-
23
N-
P
51
N+
(f)
22
24
N+
N+
P-
N-
P
N+
(g)
S
G
P+
N+
N+
P-
N-
P
N+
D

FIG.4

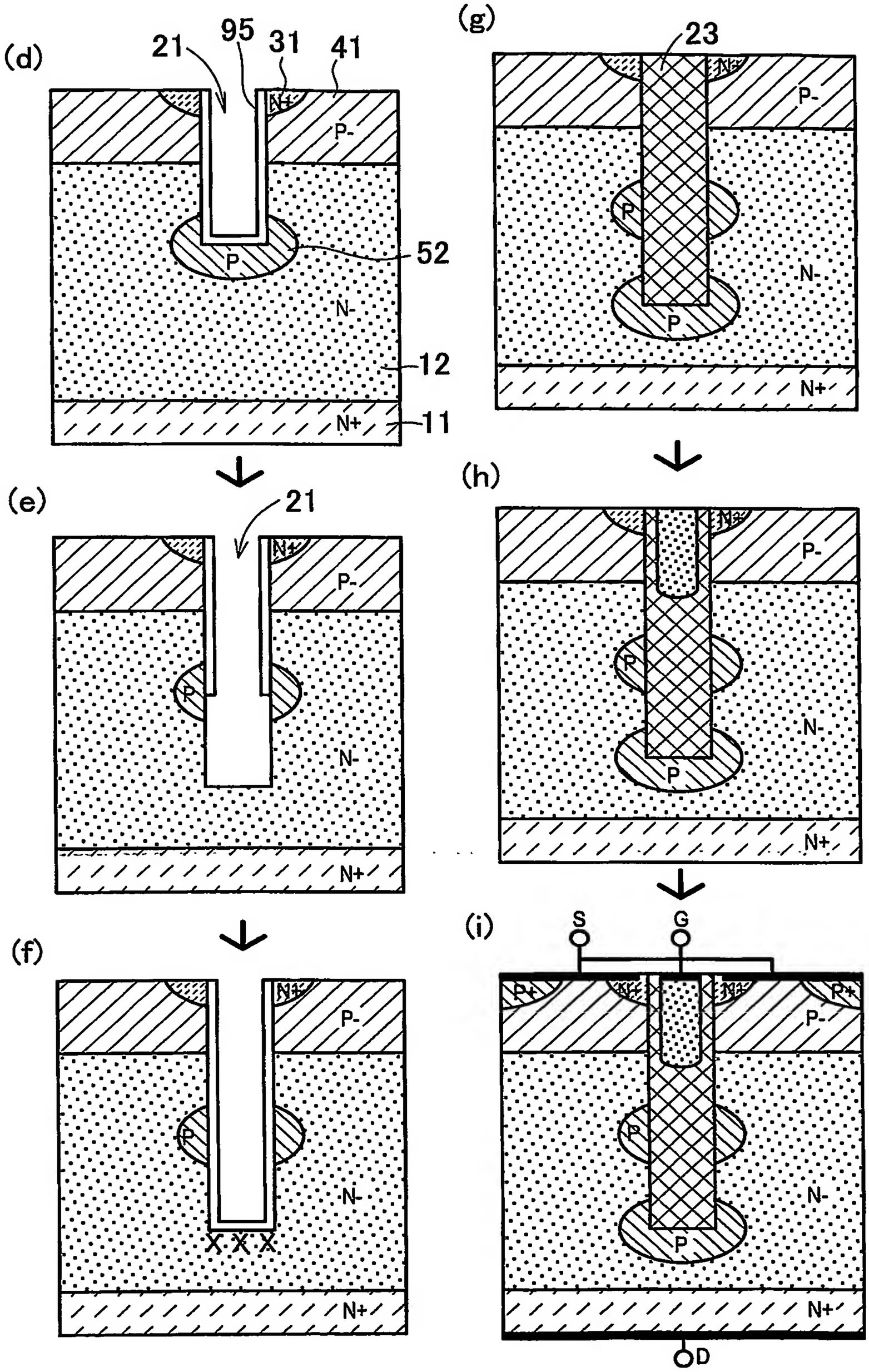

(d)
21
95
31
41
N+
P-
P
52
N-
12
N+
11
(e)
21
N+
P-
P
N-
N+
(f)
N+
P-
P
N-
X X X
N+
(g)
23
N+
P-
P
N-
P
N+
(h)
N+
P-
P
N-
P
N+
(i)
S
G
P+
N+
N+
P+
P-
P
N-
P
N+
D

FIG.5

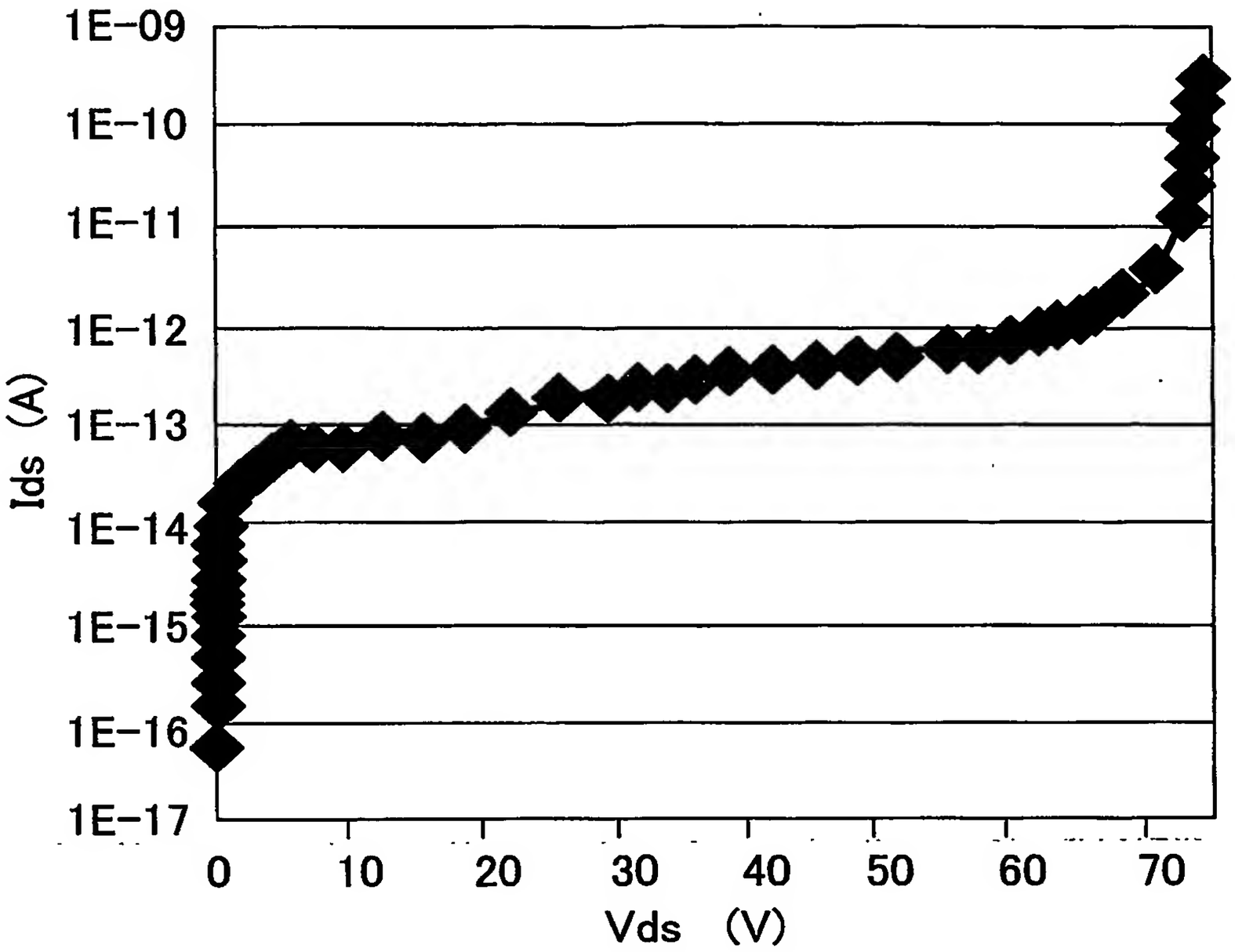
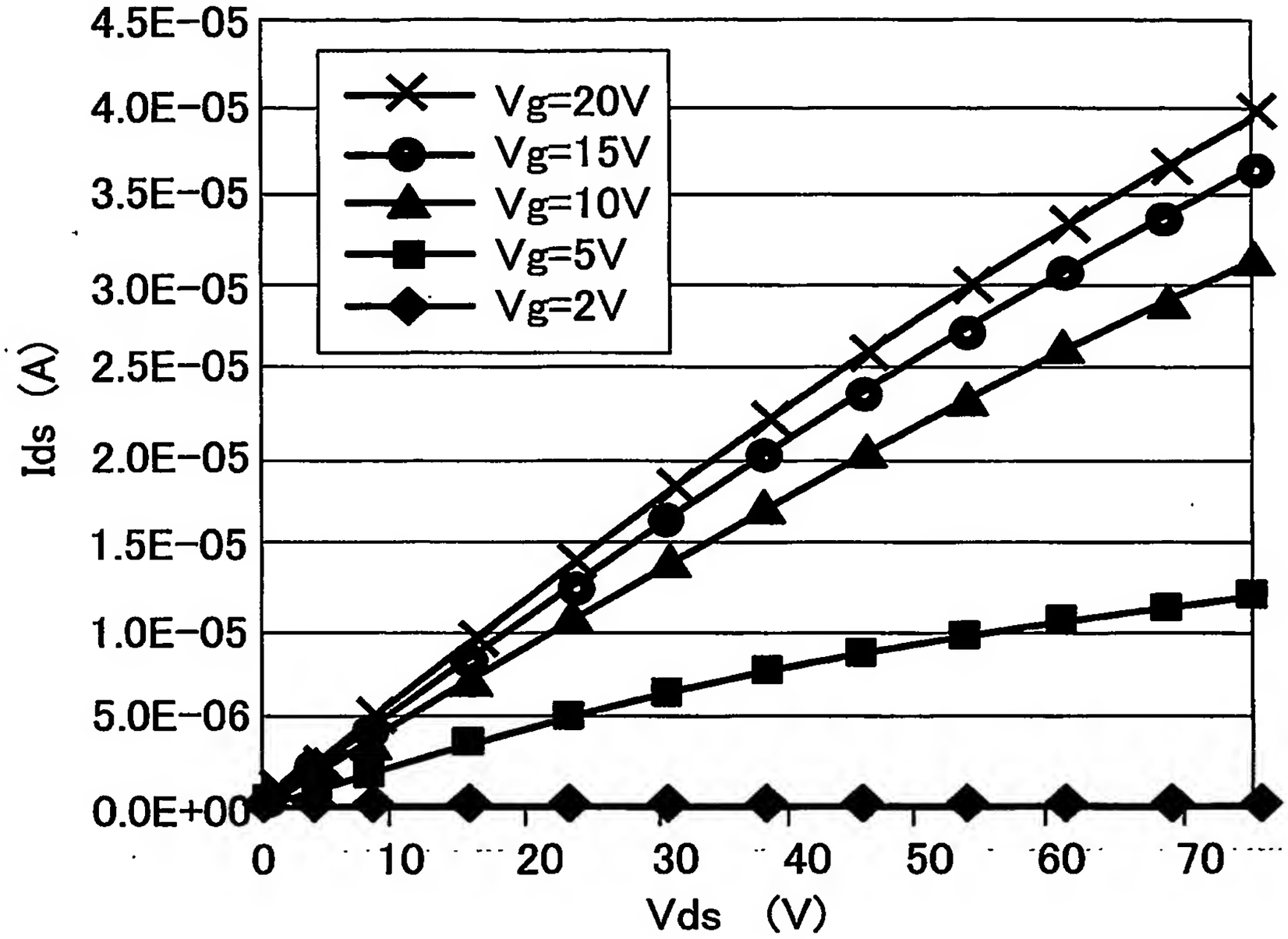

1E-09
1E-10
1E-11
1E-12
1E-13
1E-14
1E-15
1E-16
1E-17
Ids (A)
0
10
20
30
40
50
60
70
Vds (V)

FIG.6


4.5E-05
4.0E-05
3.5E-05
3.0E-05
2.5E-05
2.0E-05
1.5E-05
1.0E-05
5.0E-06
0.0E+00
Ids (A)
0
10
20
30
40
50
60
70
Vds (V)
Vg=20V
Vg=15V
Vg=10V
Vg=5V
Vg=2V

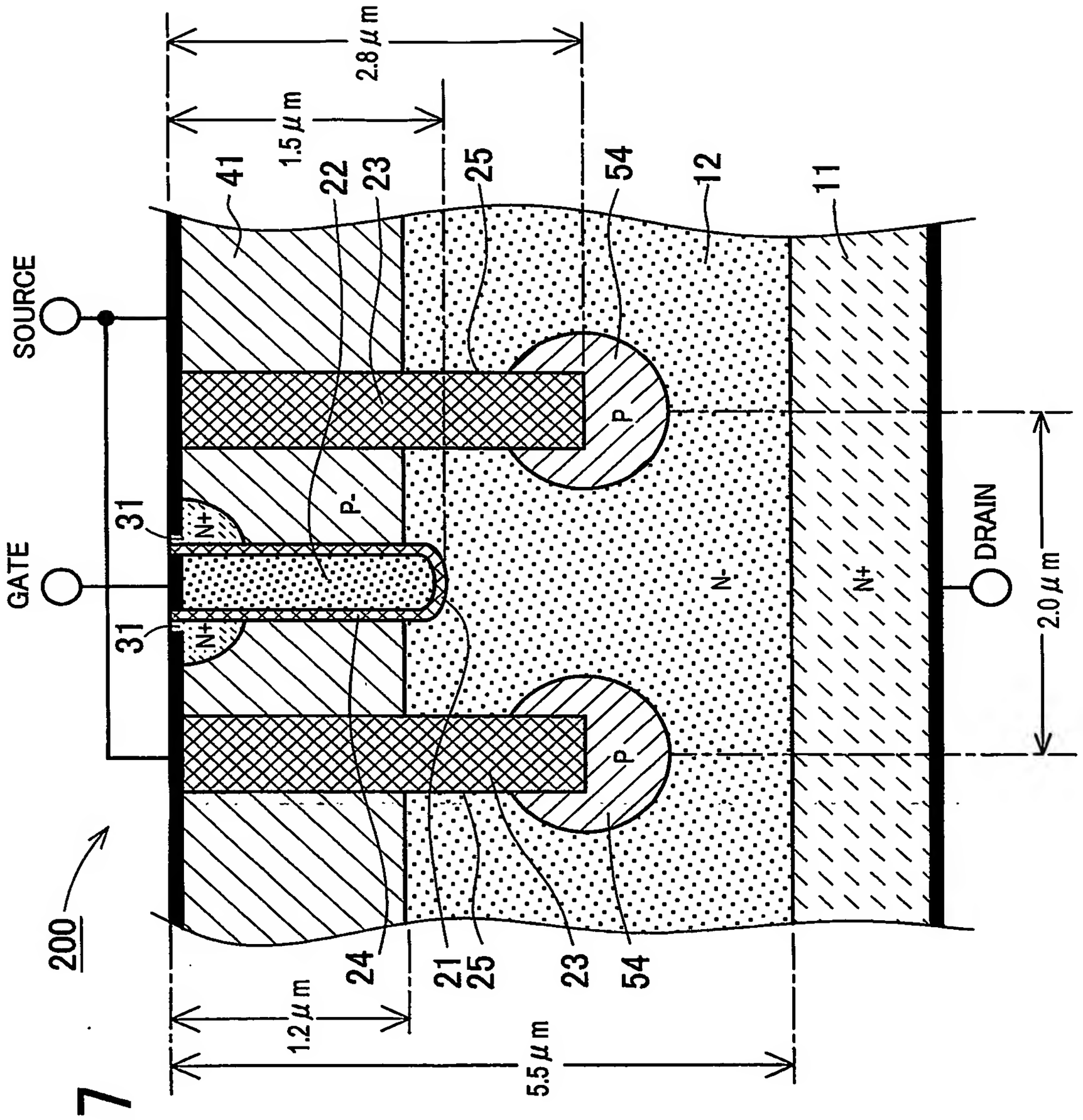

2.8μm
1.5μm
41
22
23
25
54
12
11
SOURCE
GATE
31
31
N+
N+
P-
P
P
N-
N+
DRAIN
2.0μm
200
24
21
25
23
54
1.2μm
5.5μm

FIG.7

FIG.8

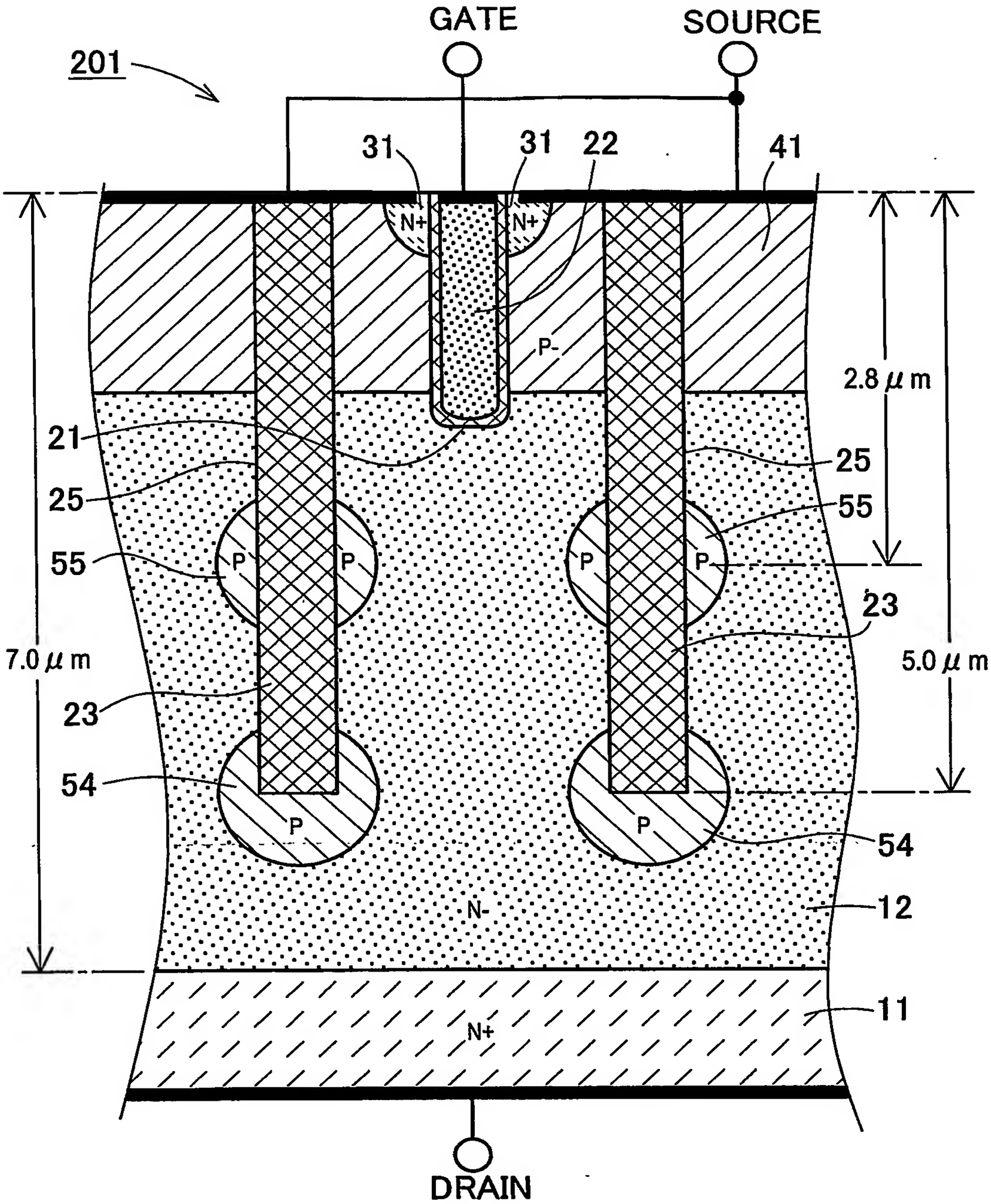

GATE
SOURCE
201
31
31
22
41
N+
N+
P-
2.8 μm
21
25
25
55
55
P
P
P
P
23
7.0 μm
5.0 μm
23
54
54
P
P
N-
12
11
N+
DRAIN

FIG.9

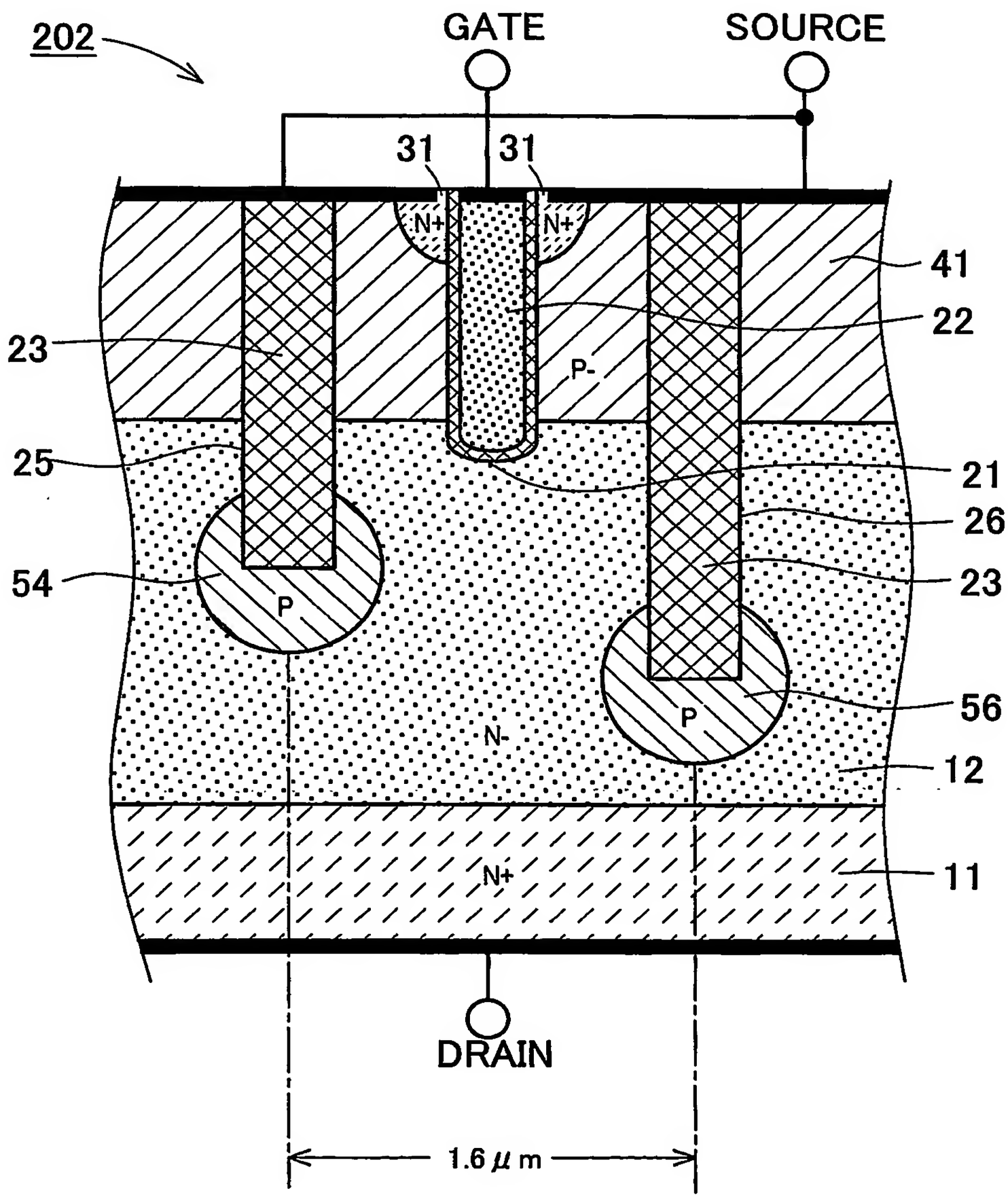

202
GATE
SOURCE
31
31
N+
N+
41
22
23
P-
25
21
26
54
P
23
P
56
N-
12
N+
11
DRAIN
1.6 μ m

FIG.10

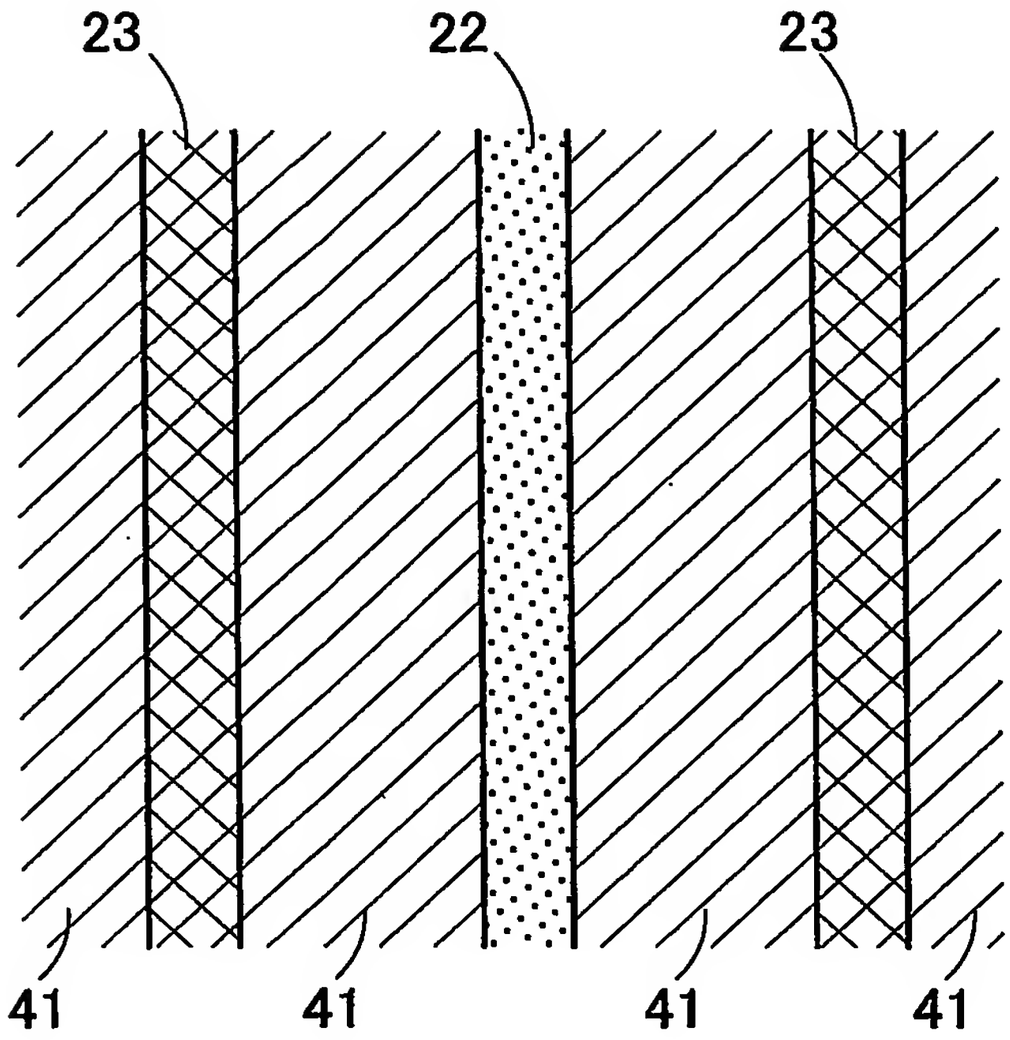


FIG.11

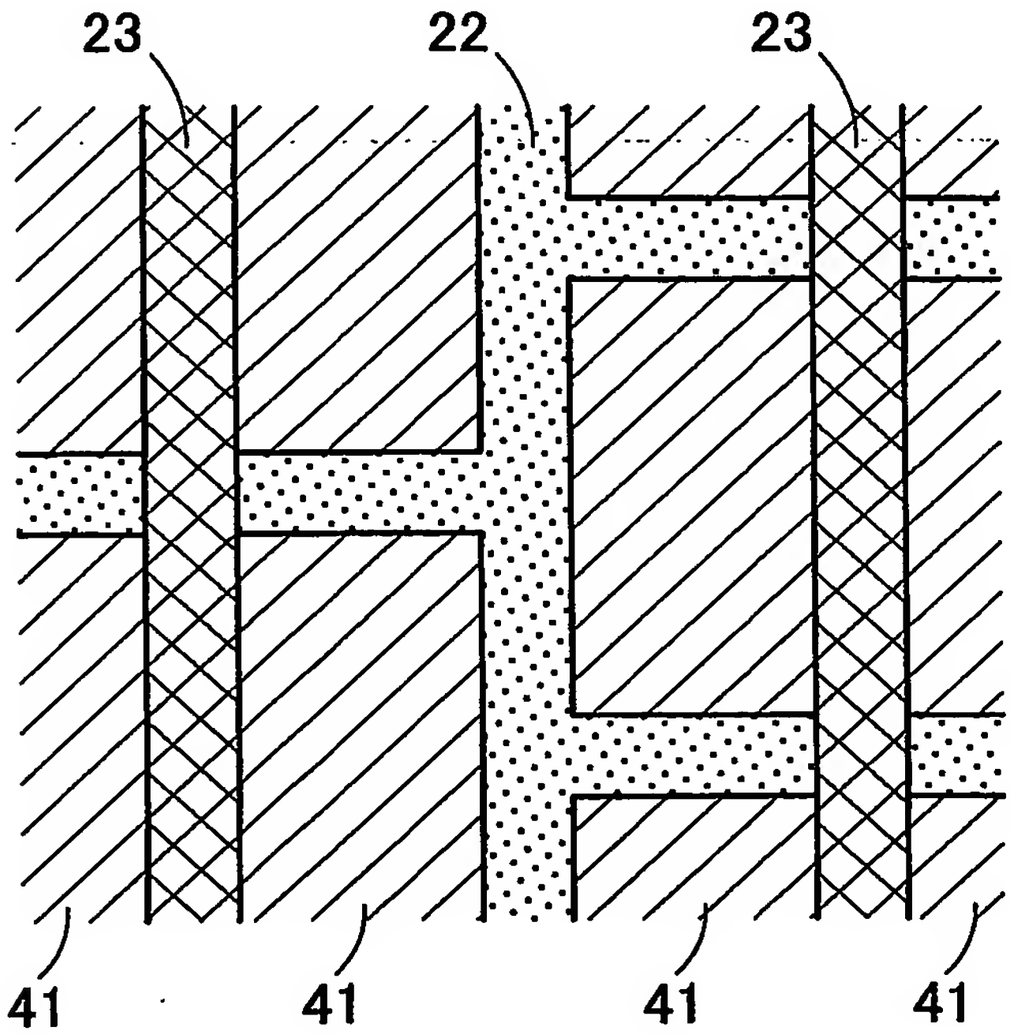


FIG.12

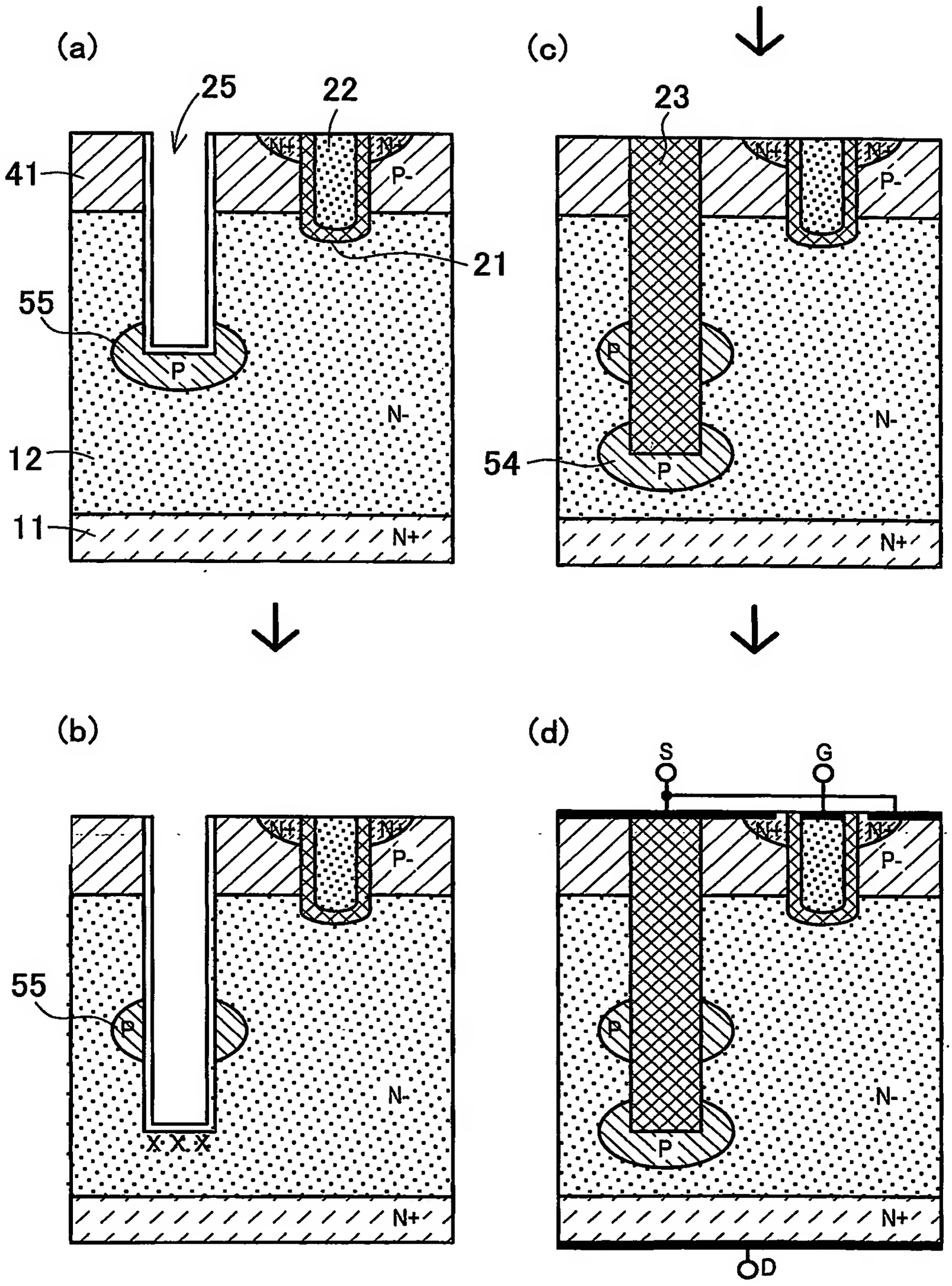

(a)
25
22
41
N+
N+
P-
21
55
P
N-
12
11
N+
(c)
23
N+
N+
P-
P
N-
54
P
N+
(b)
P-
55
P
N-
X X X
N+
(d)
S
G
N+
N+
P-
P
N-
P
N+
D

FIG.13

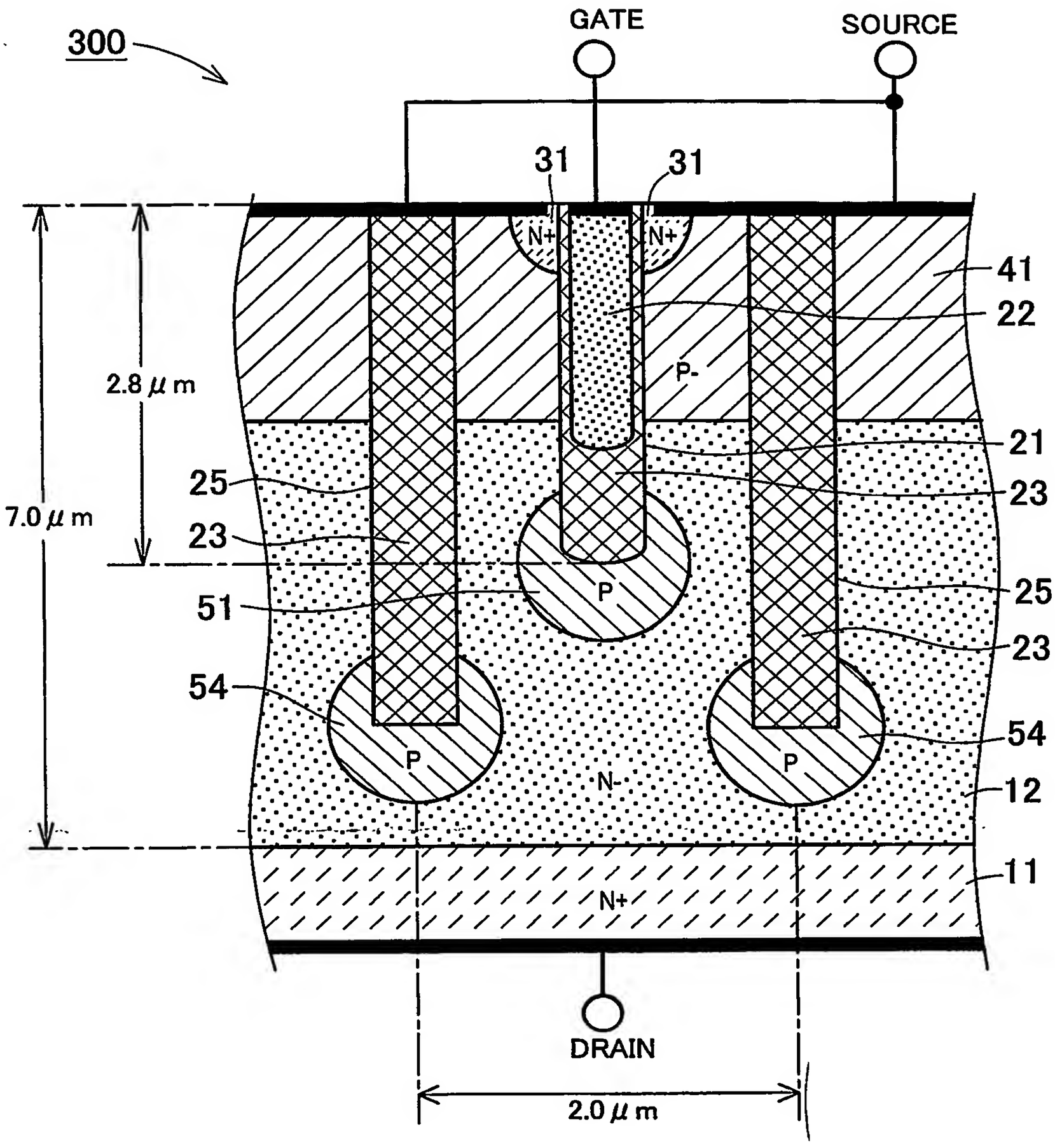

300
GATE
SOURCE
31
31
N+
N+
41
22
P-
21
25
23
2.8 μm
7.0 μm
23
P
51
25
23
54
P
P
54
N-
12
11
N+
DRAIN
2.0 μm

FIG.14

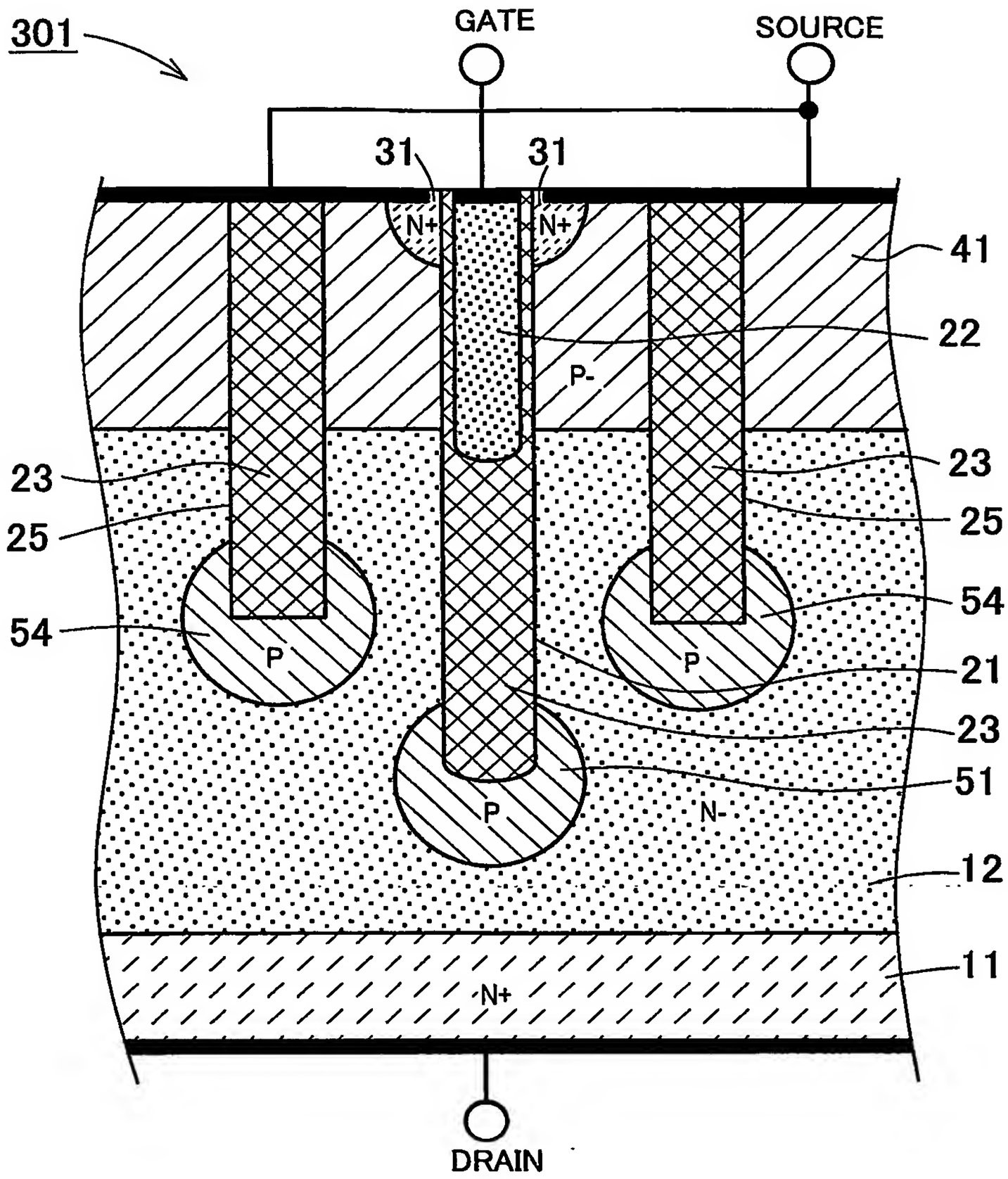

301
GATE
SOURCE
31
31
N+
N+
41
22
P-
23
25
23
25
54
P
54
P
21
23
P
N-
51
12
11
N+
DRAIN

FIG.15

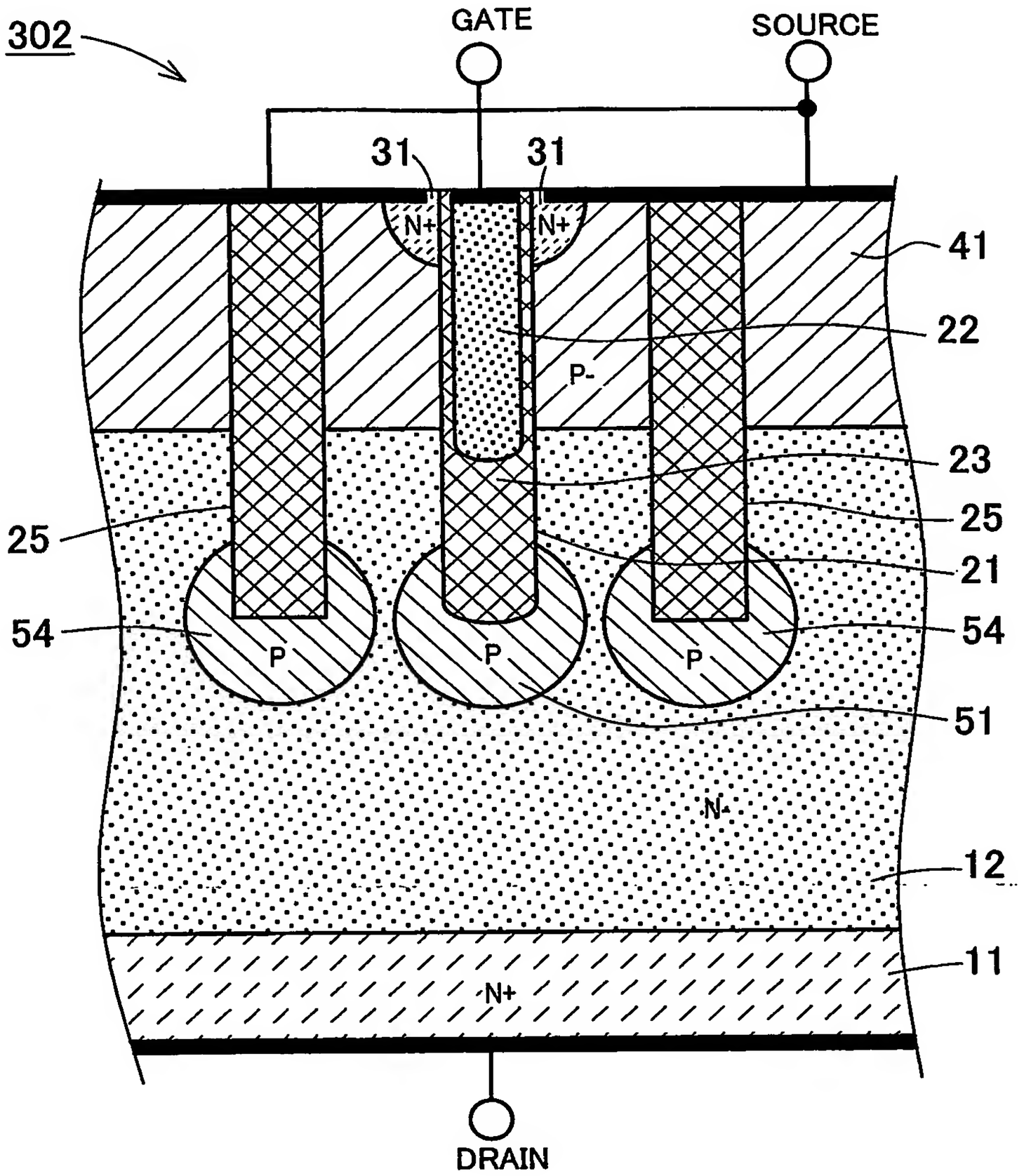

302
GATE
SOURCE
31
31
N+
N+
41
22
P-
23
25
25
21
54
54
P
P
P
51
N-
12
11
N+
DRAIN

FIG.16

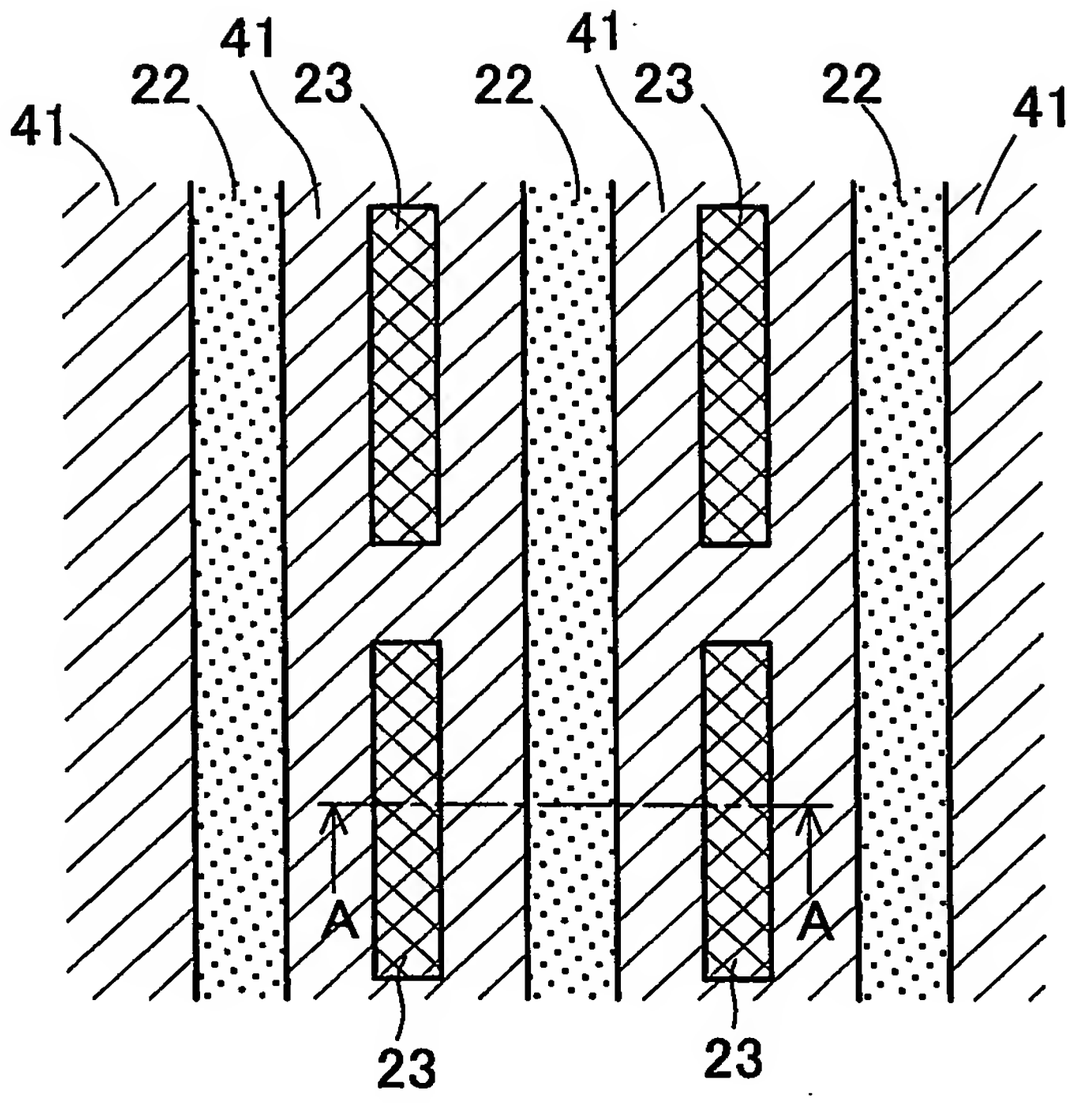


FIG.17

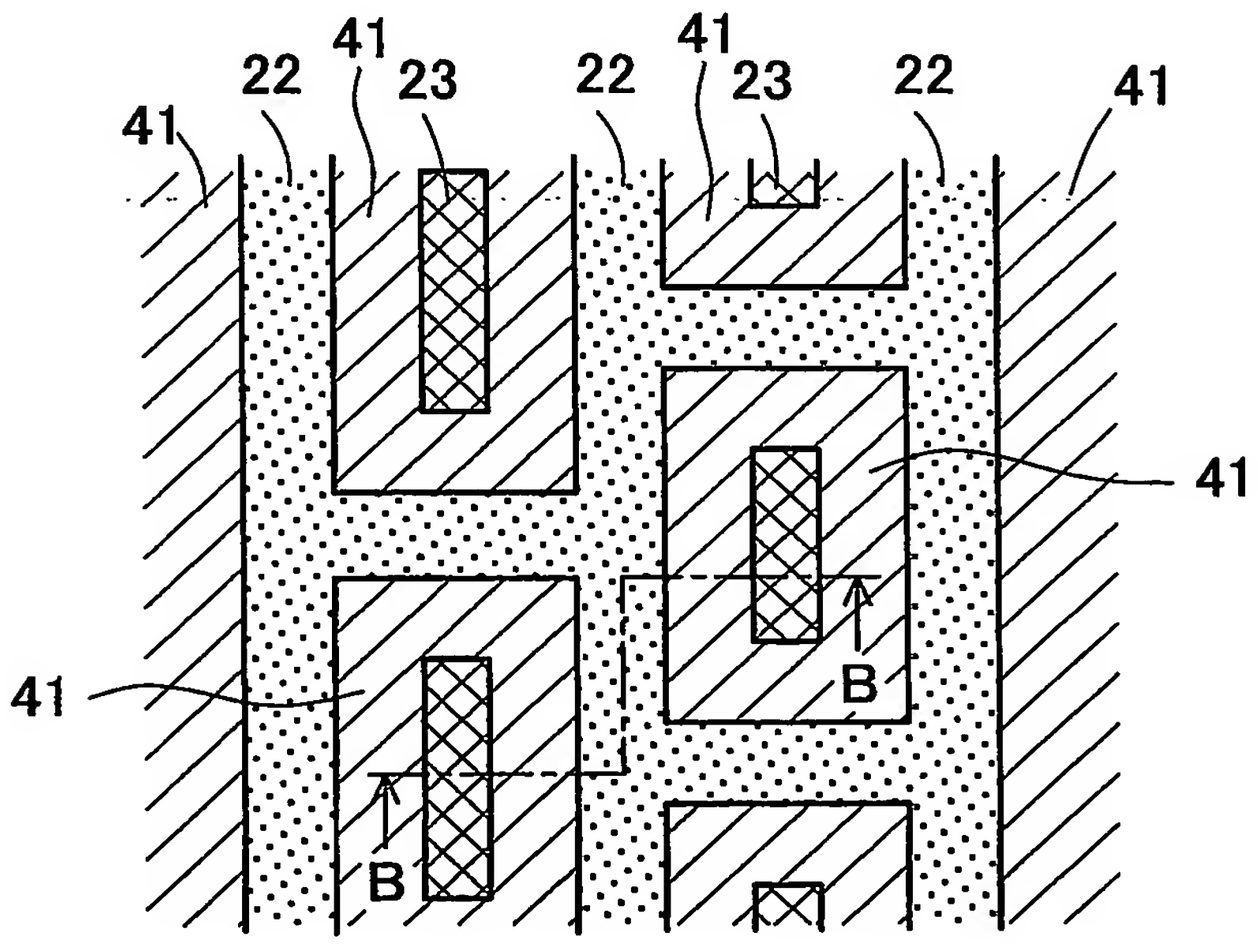


FIG.18

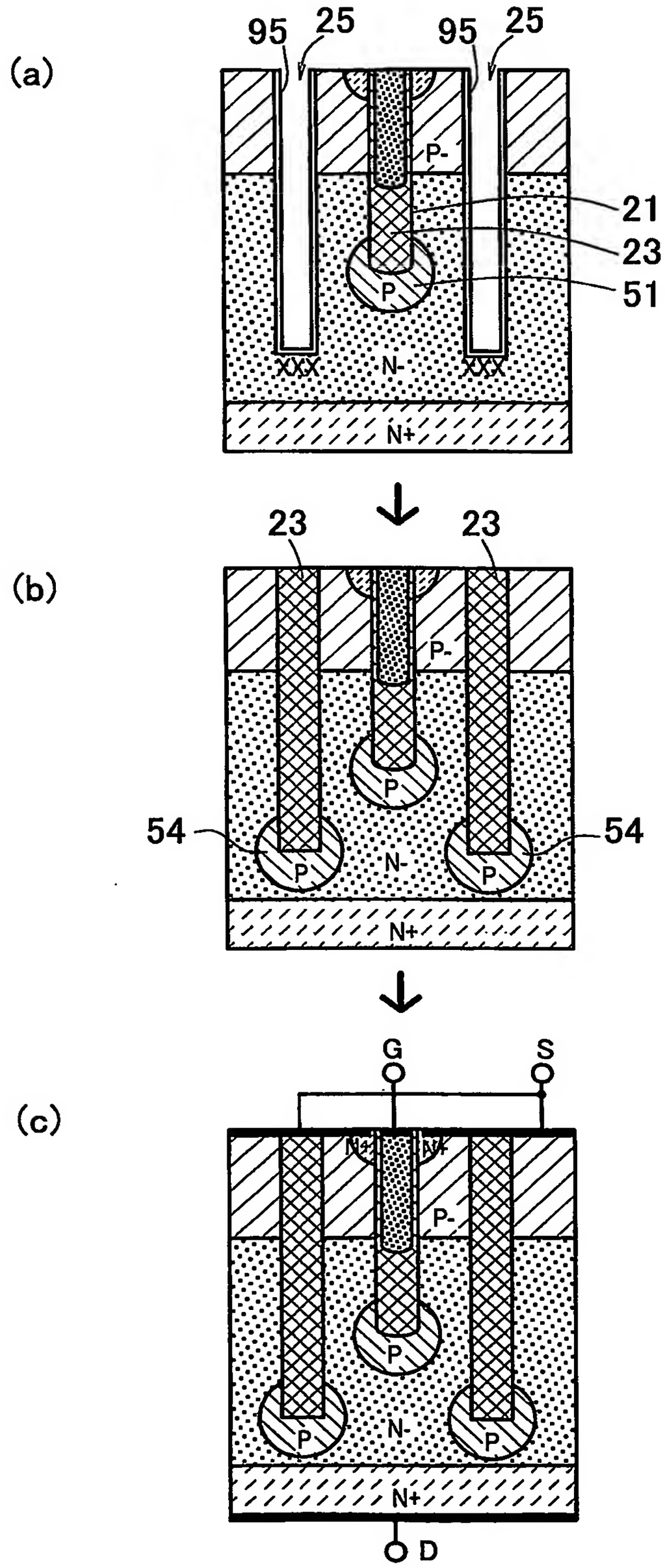
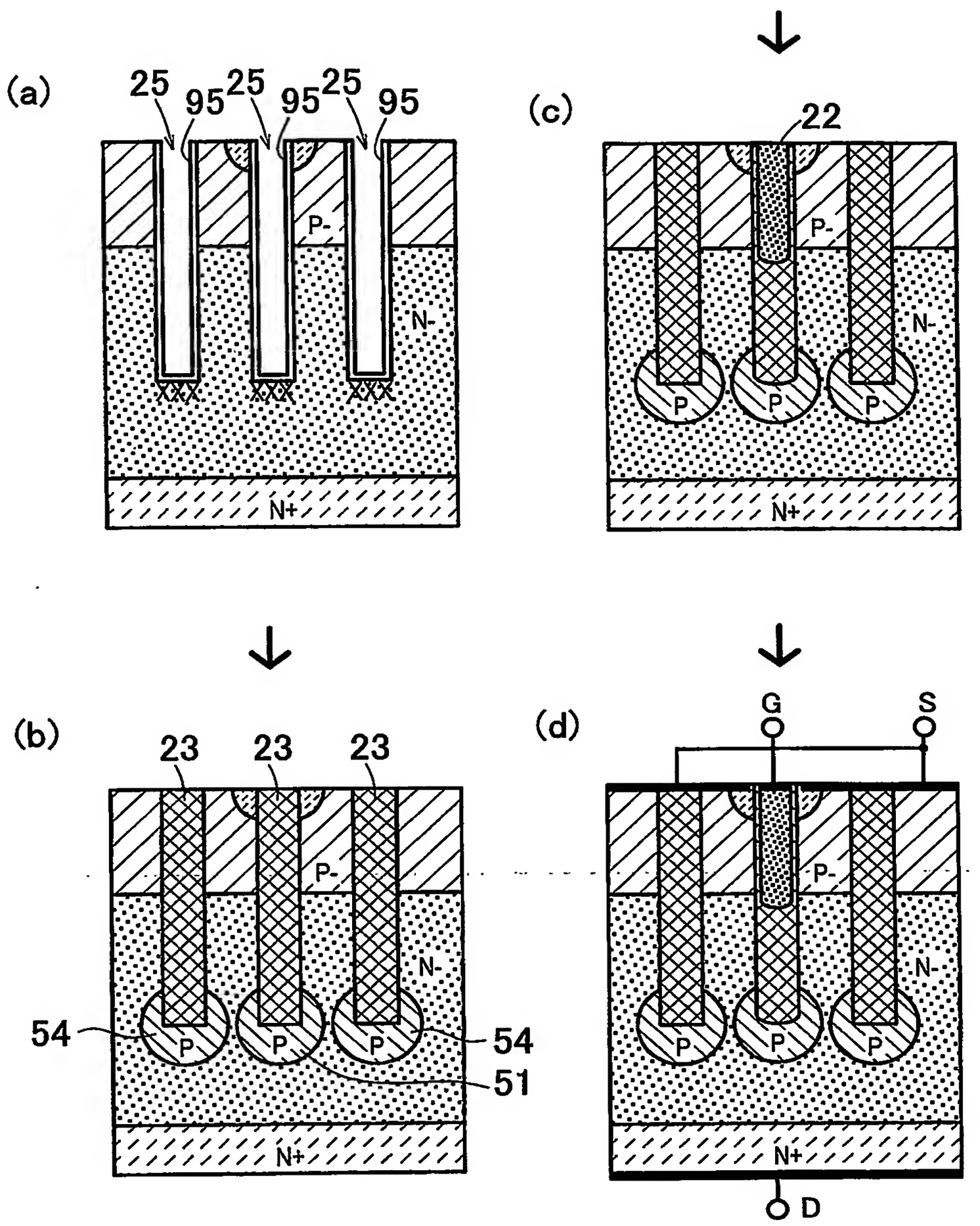

(a)
95
25
95
25
P-
21
23
51
P
XXX
N-
XXX
N+
(b)
23
23
P-
P
54
54
P
N-
P
N+
(c)
G
S
N+
N+
P-
P
P
N-
P
N+
D

FIG.19


(a)
25
95
25
95
25
95
P-
N-
N+
(c)
22
P-
N-
P
P
P
N+
(b)
23
23
23
P-
N-
54
P
P
P
54
51
N+
(d)
G
S
P-
N-
P
P
P
N+
D

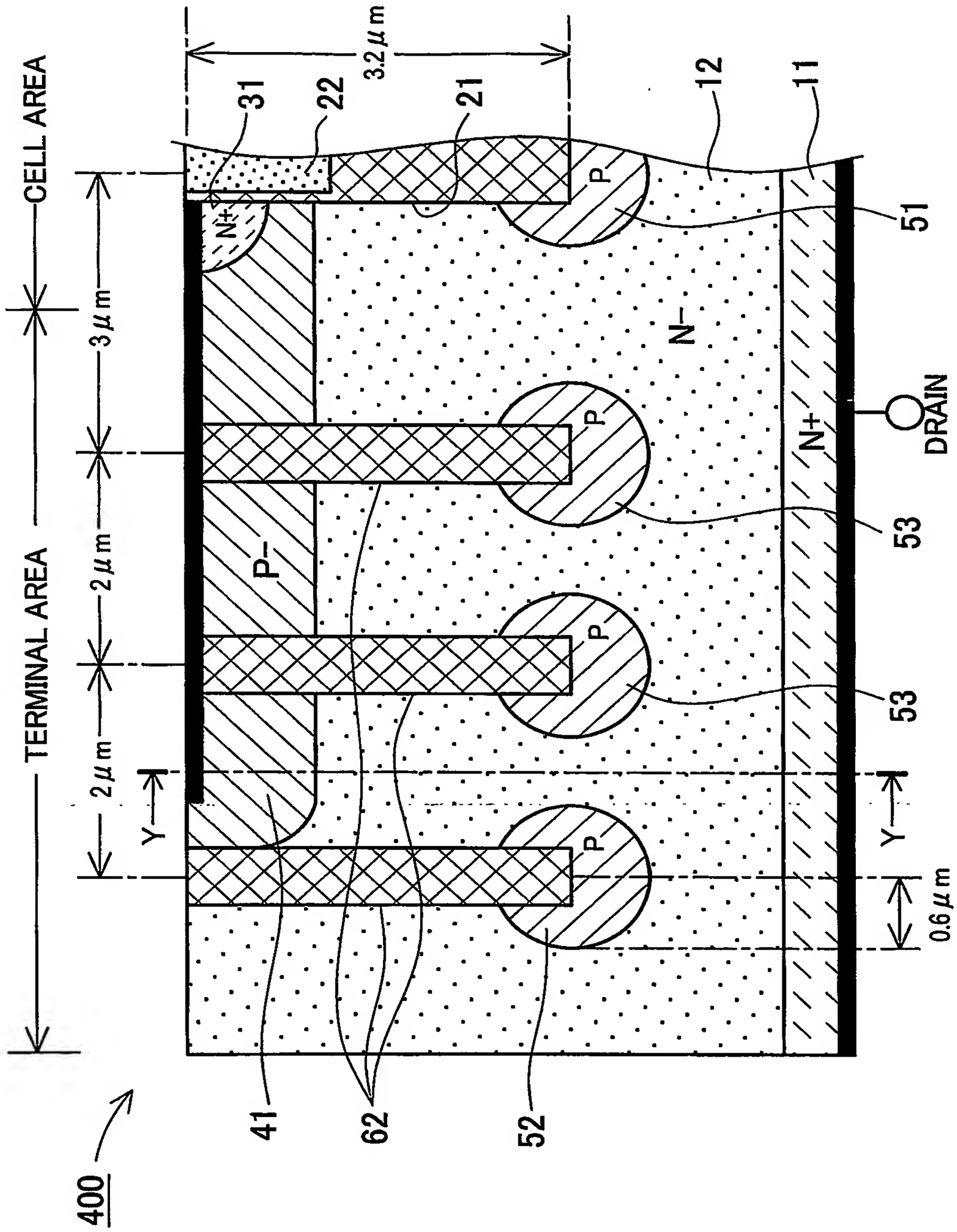

CELL AREA
TERMINAL AREA
3.2μm
3μm
2μm
2μm
0.6μm
31
22
21
12
11
51
N+
P
N−
P−
53
DRAIN
Y
41
62
52
400

FIG.20

FIG.21

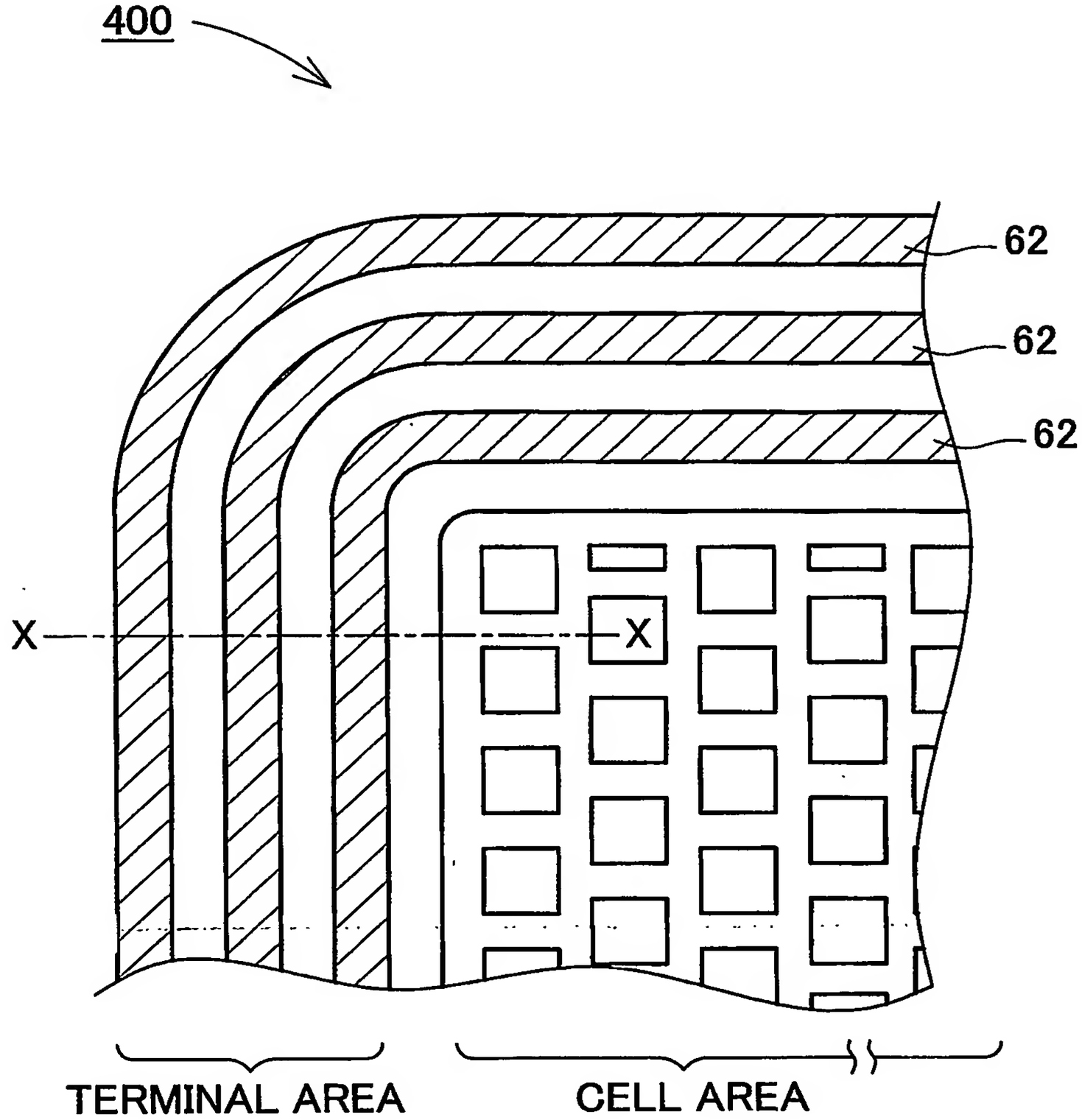
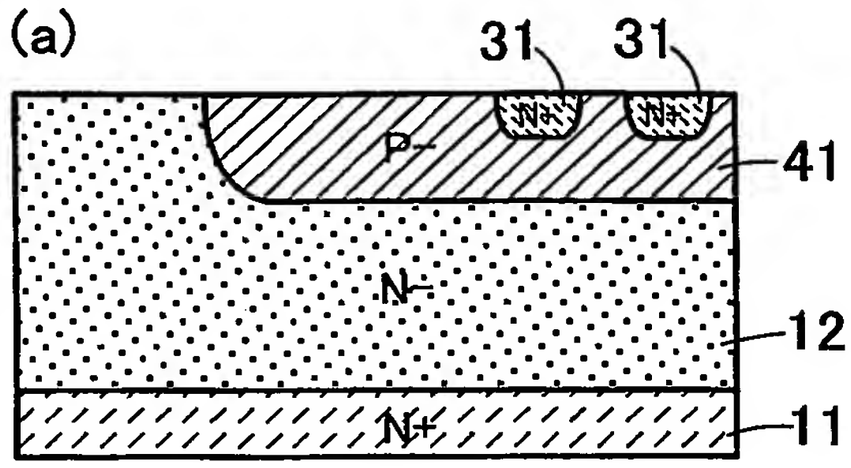
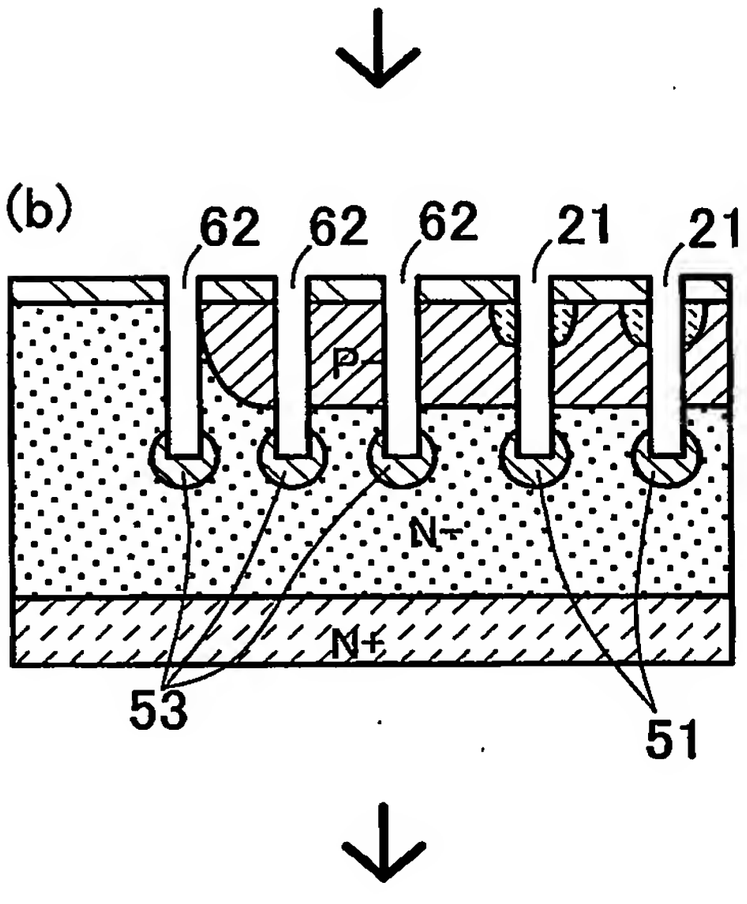
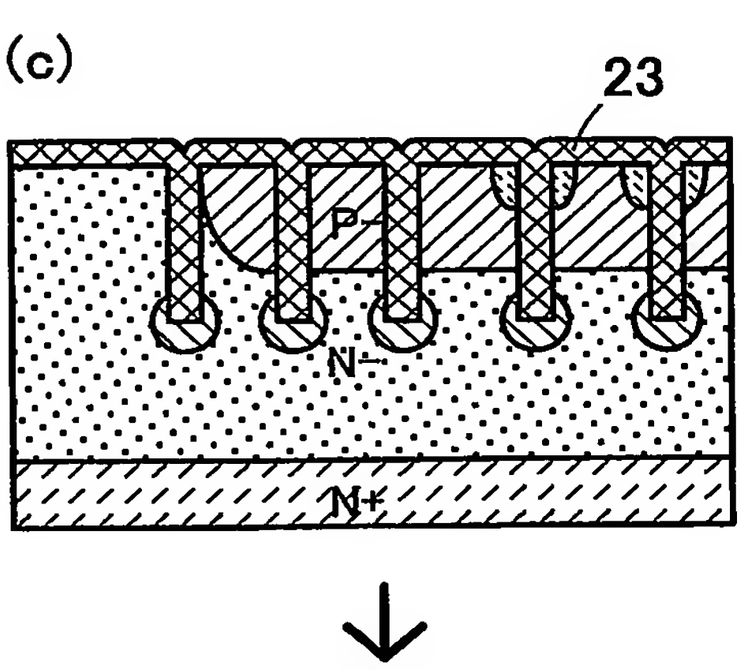
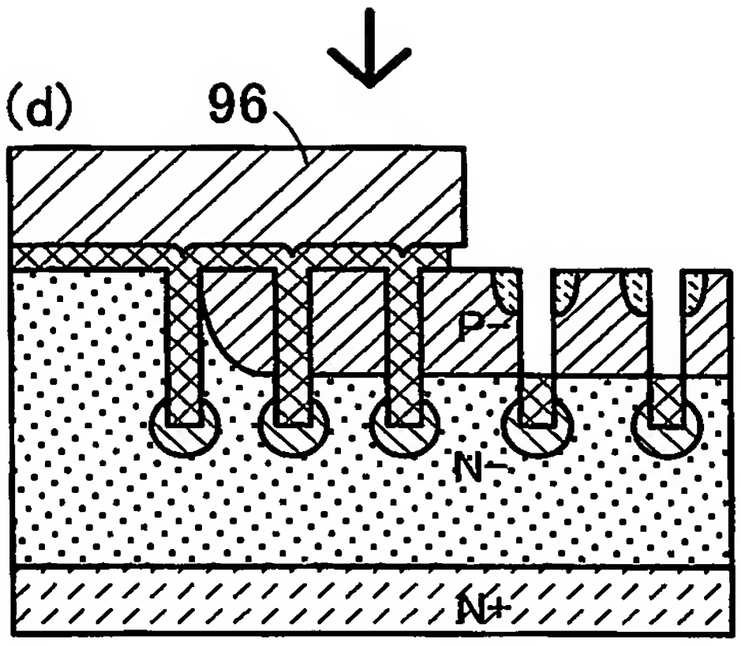


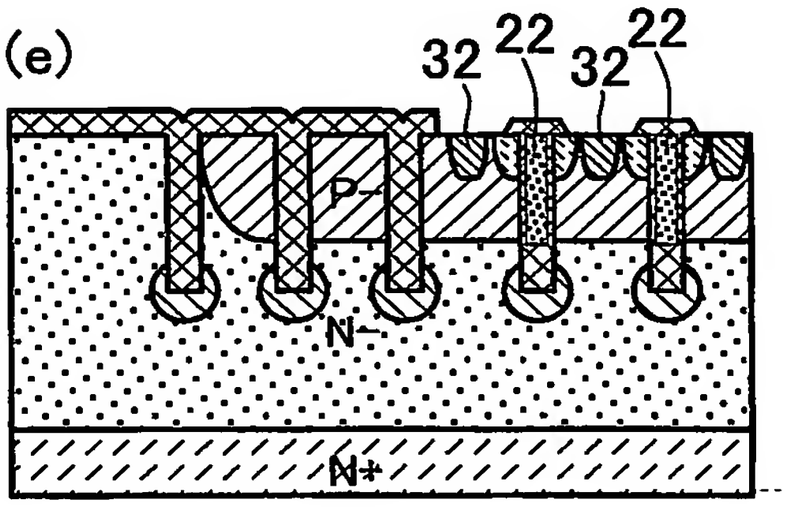
FIG.22


(a)
31
31
P-
41
N-
12
N+
11


(b)
62
62
62
21
21
P-
N-
N+
53
51


(c)
23
P-
N-
N+


(d)
96
P-
N-
N+


(e)
32
22
32
22
P-
N-
N+

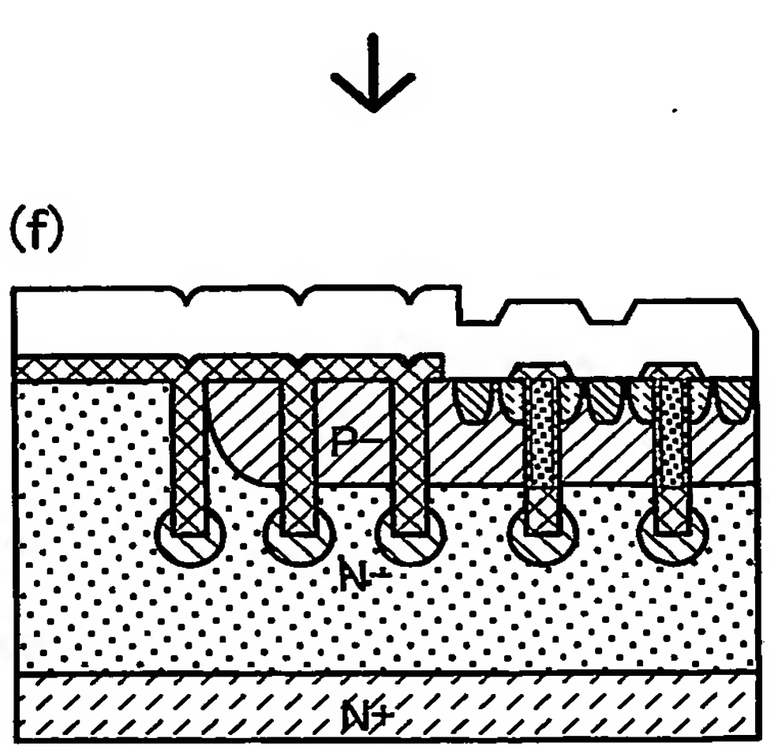
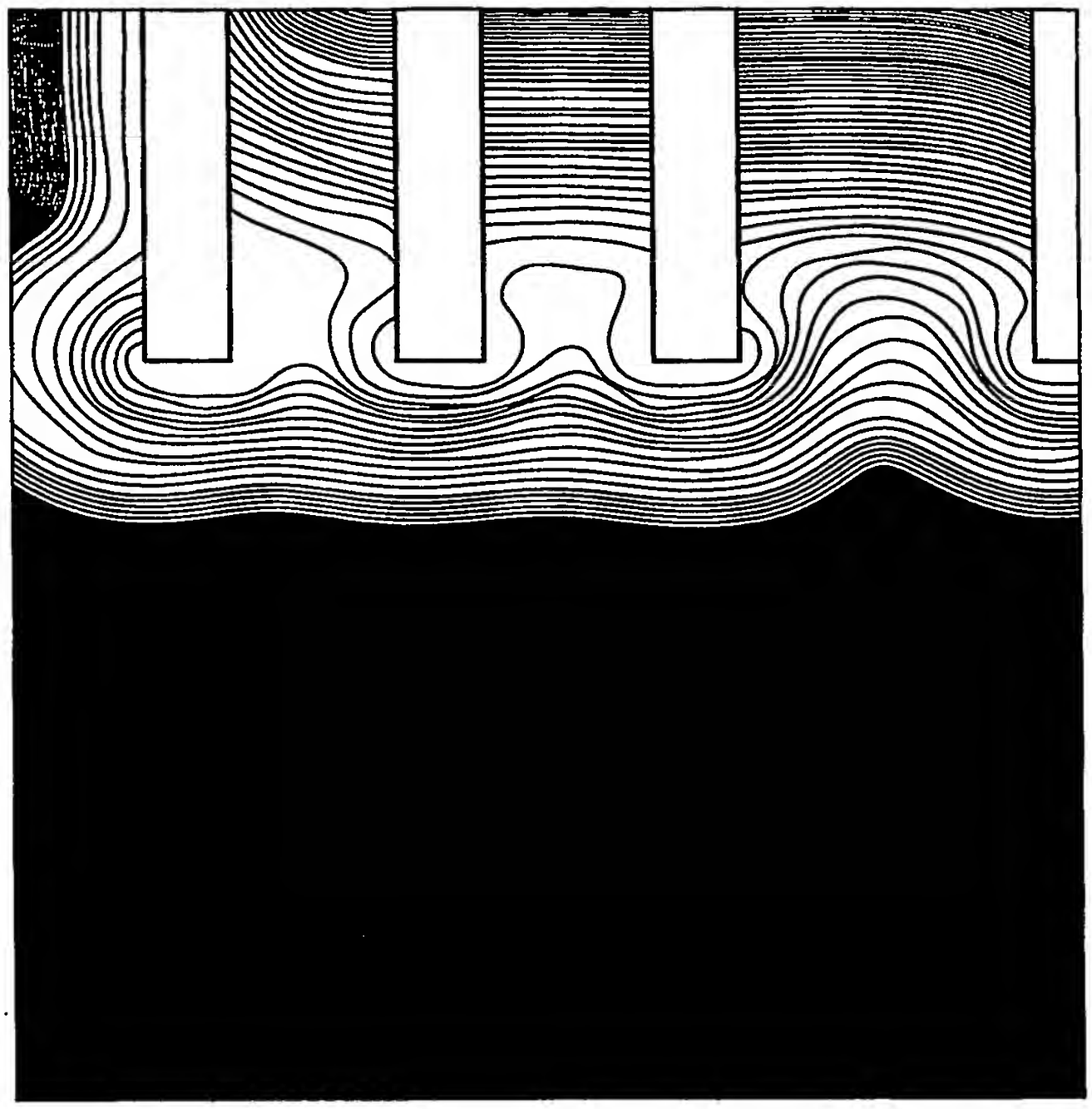

(f)
P-
N-
N+

FIG.23



BEST AVAILABLE COPY

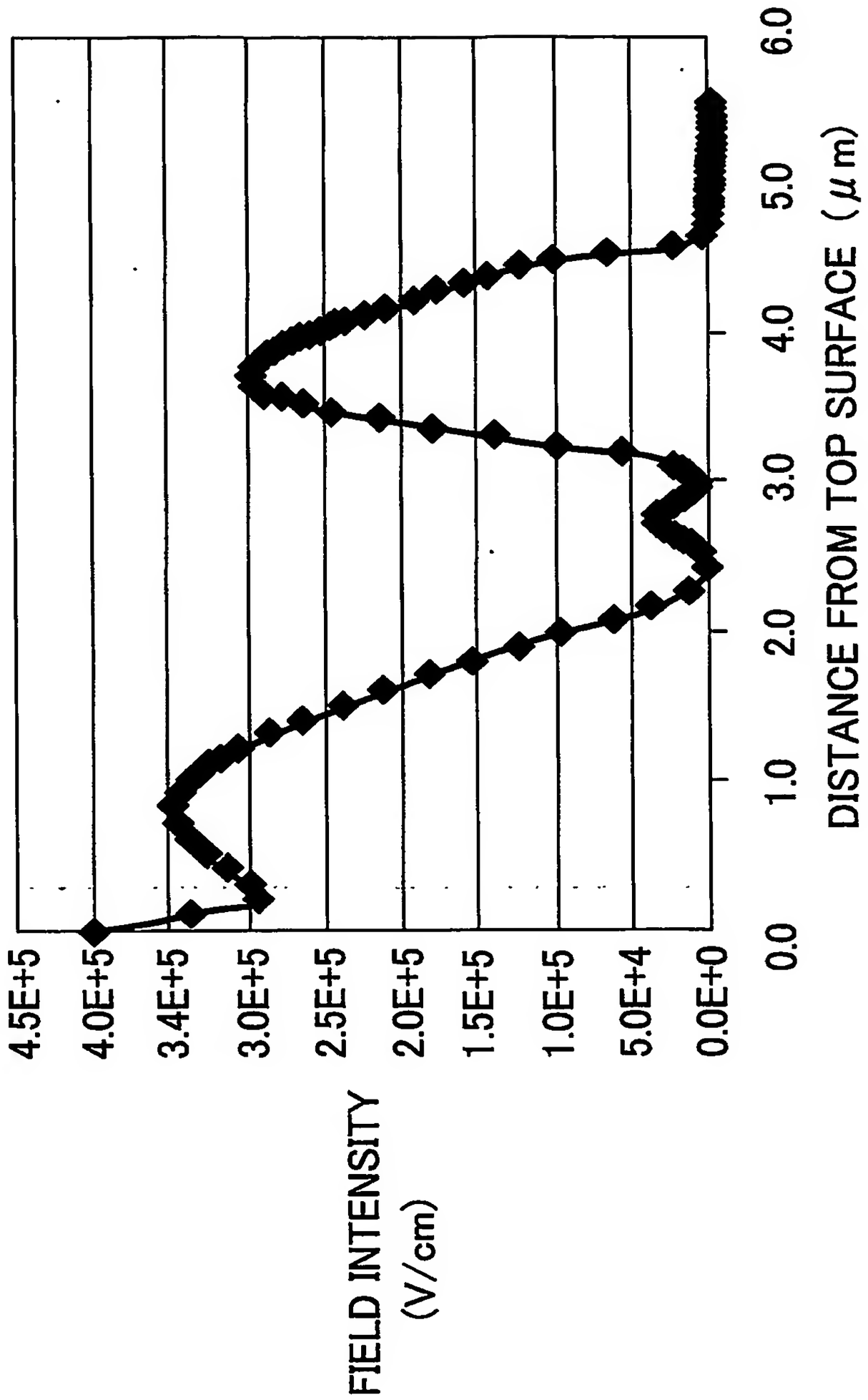

FIELD INTENSITY (V/cm)
4.5E+5
4.0E+5
3.4E+5
3.0E+5
2.5E+5
2.0E+5
1.5E+5
1.0E+5
5.0E+4
0.0E+0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
DISTANCE FROM TOP SURFACE (μm)

FIG.24

FIG.25

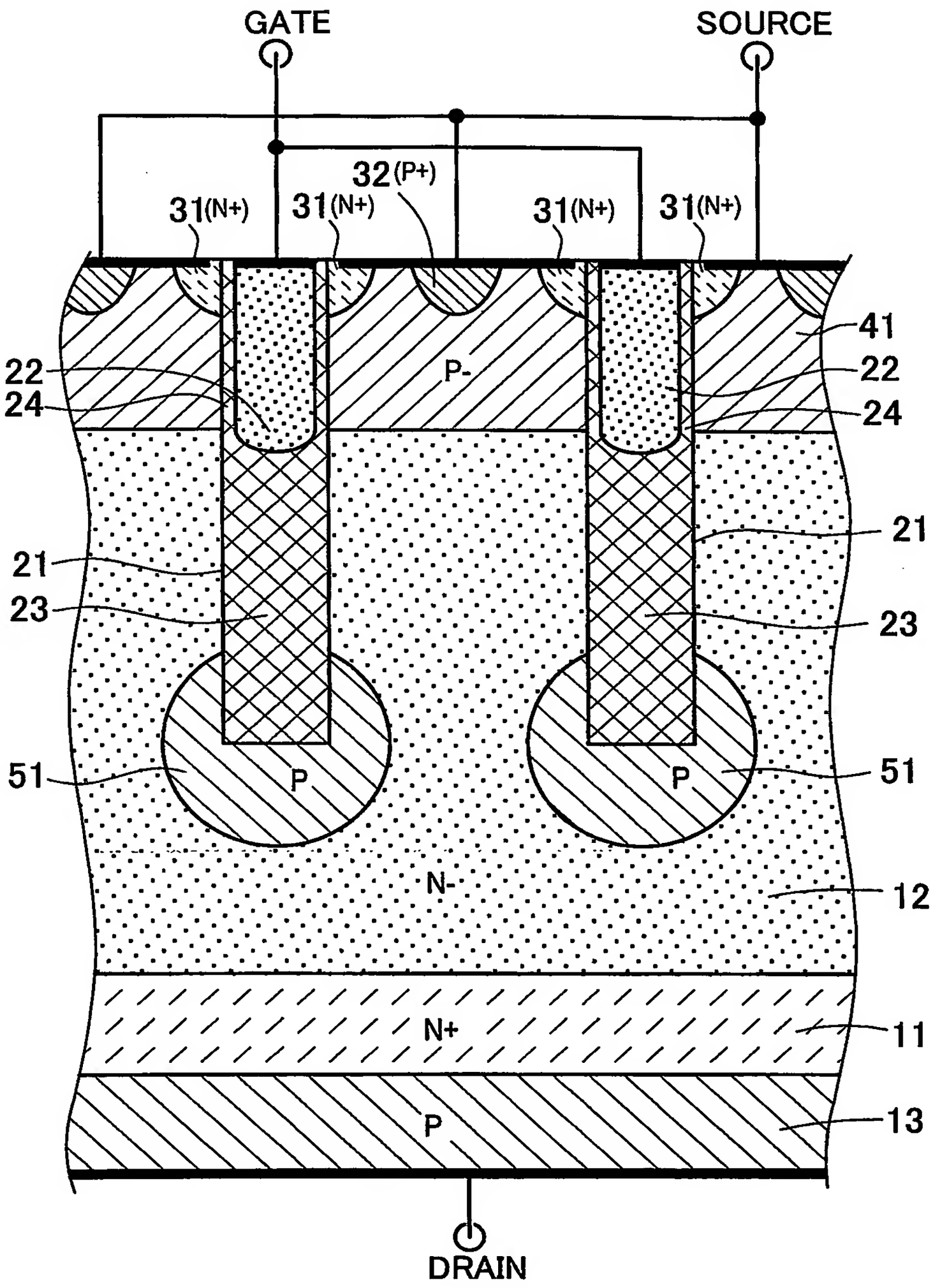

GATE
SOURCE
32(P+)
31(N+)
31(N+)
31(N+)
31(N+)
41
22
24
P-
22
24
21
21
23
23
51
P
P
51
N-
12
N+
11
P
13
DRAIN

FIG.26

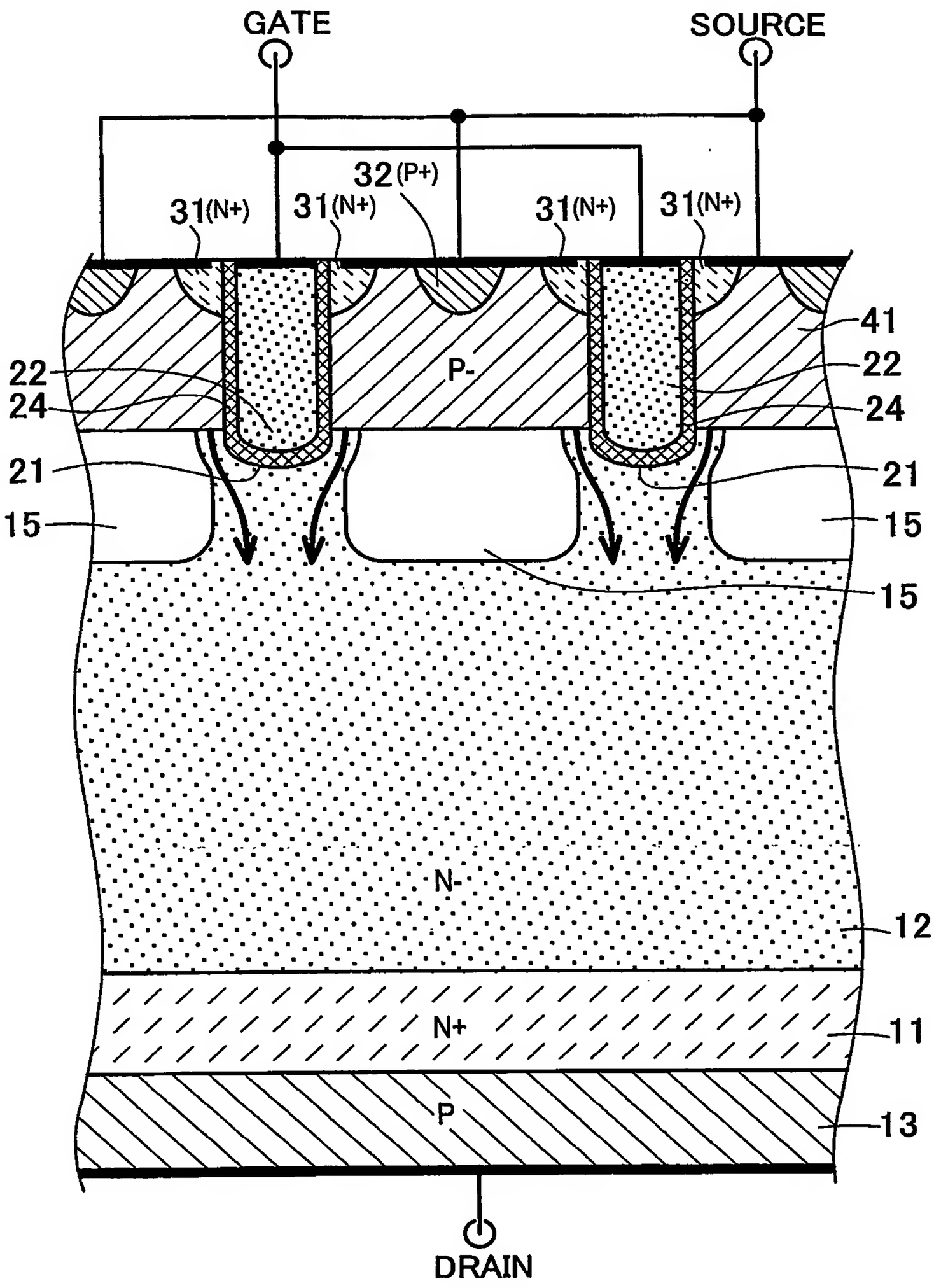

GATE
SOURCE
32(P+)
31(N+)
31(N+)
31(N+)
31(N+)
41
22
P-
22
24
24
21
21
15
15
15
N-
12
N+
11
P
13
DRAIN

FIG.27

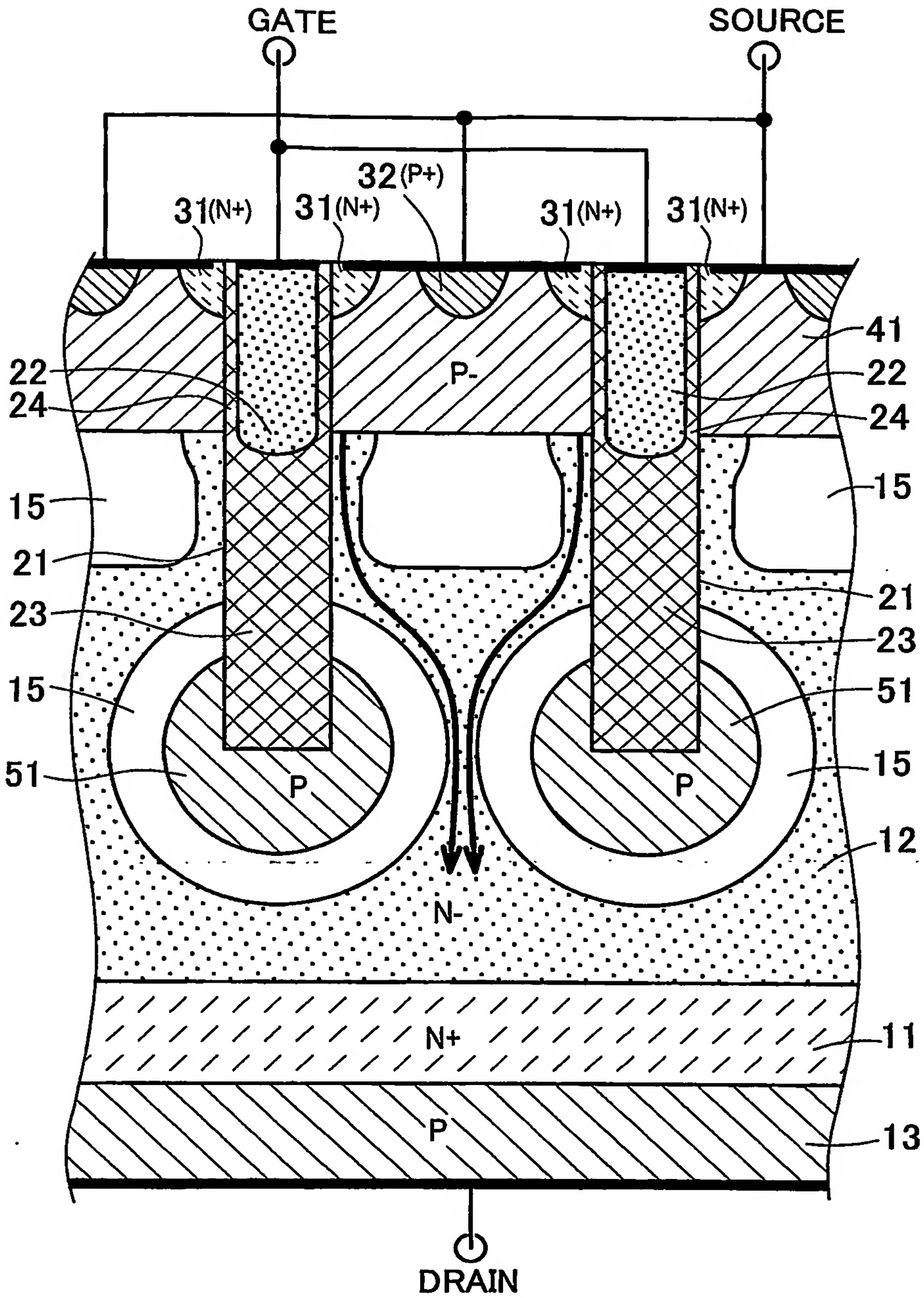

GATE
SOURCE
32(P+)
31(N+)
31(N+)
31(N+)
31(N+)
41
22
24
P-
22
24
15
15
21
21
23
23
15
51
51
P
P
15
12
N-
N+
11
P
13
DRAIN

FIG.28

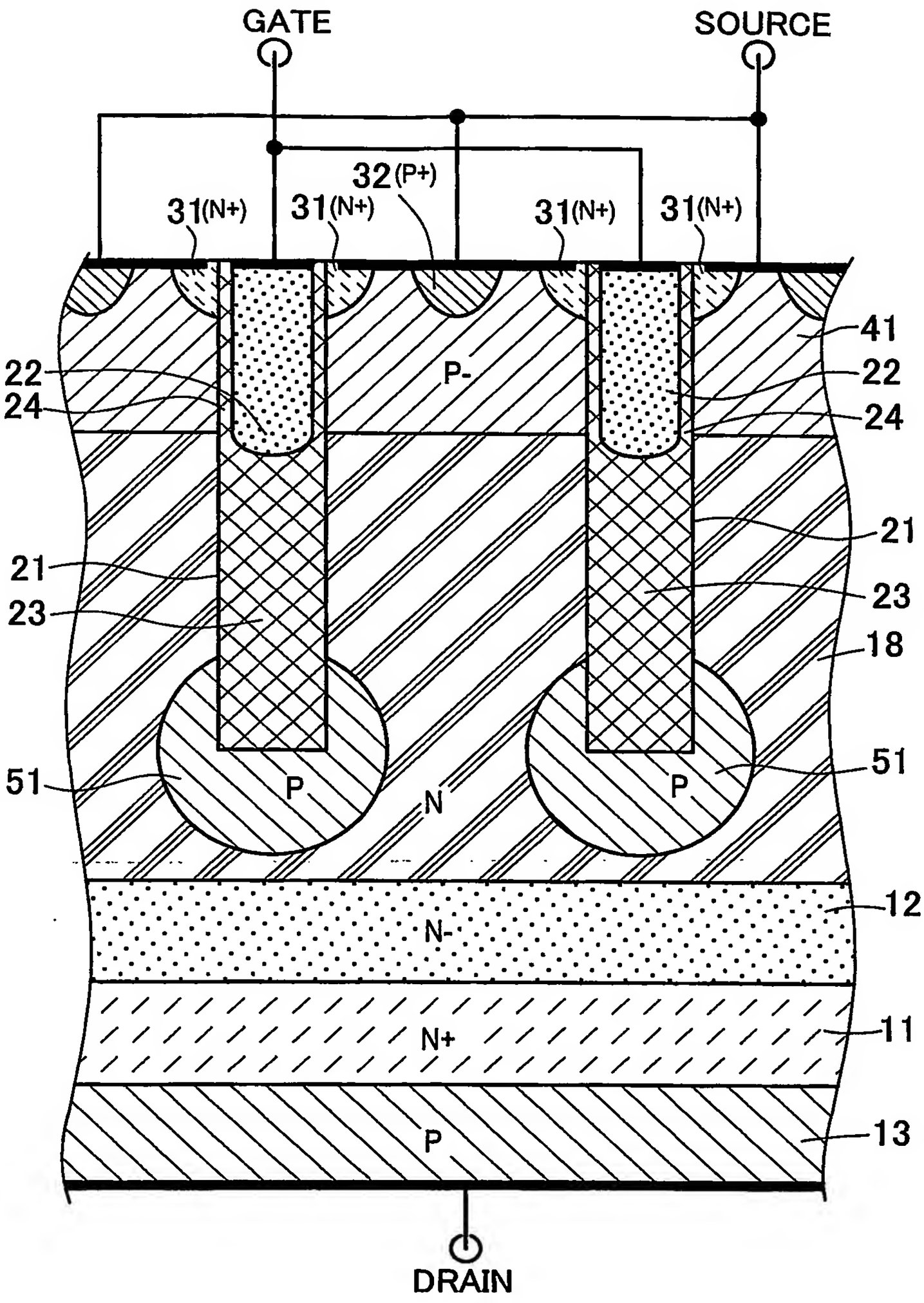

GATE
SOURCE
32(P+)
31(N+)
31(N+)
31(N+)
31(N+)
41
22
24
P-
22
24
21
21
23
23
18
51
51
P
N
P
12
N-
11
N+
13
P
DRAIN

FIG.29

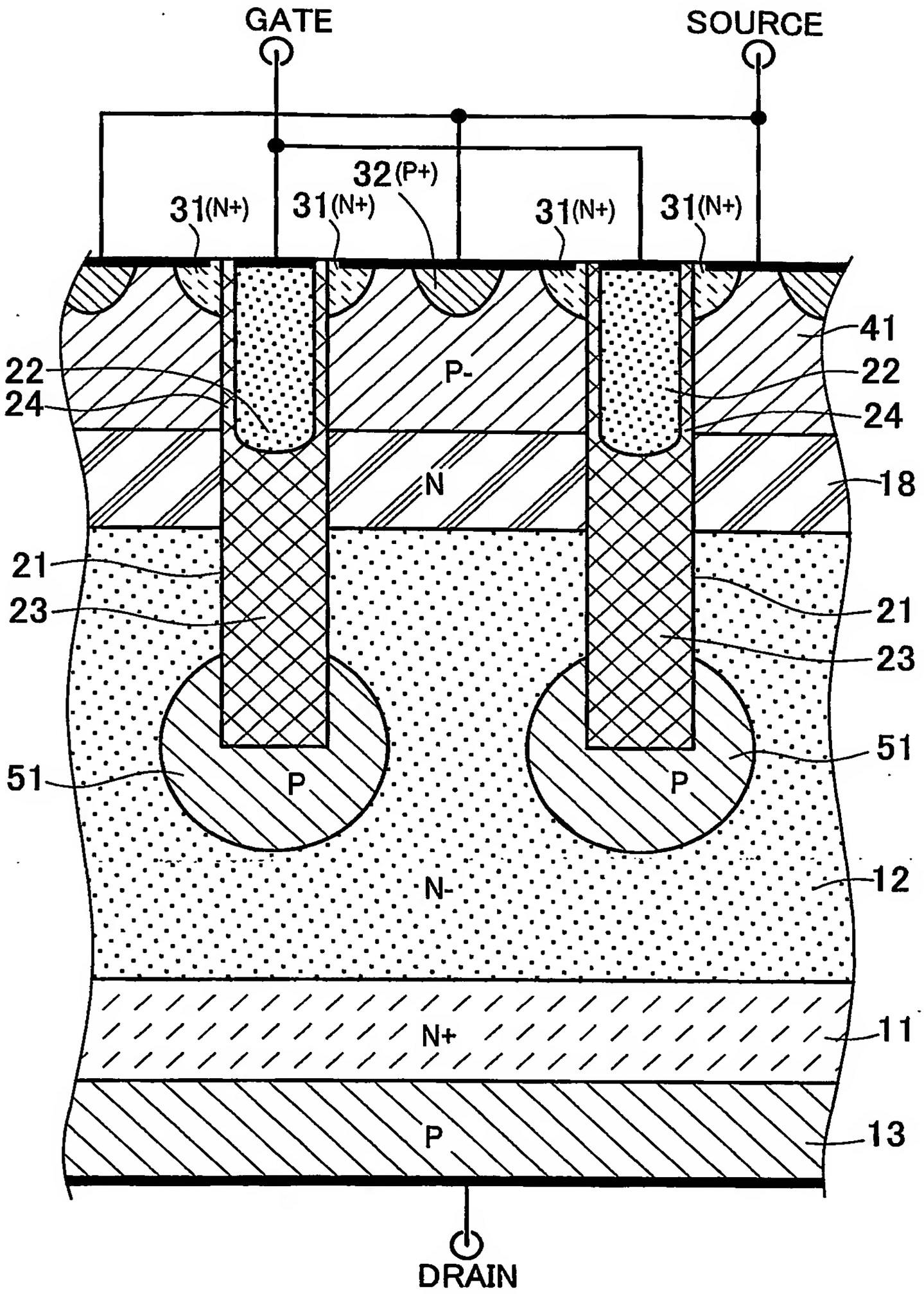

GATE
SOURCE
31(N+)
31(N+)
32(P+)
31(N+)
31(N+)
41
22
24
P-
22
24
N
18
21
23
21
23
51
51
P
P
N-
12
N+
11
P
13
DRAIN

FIG.30

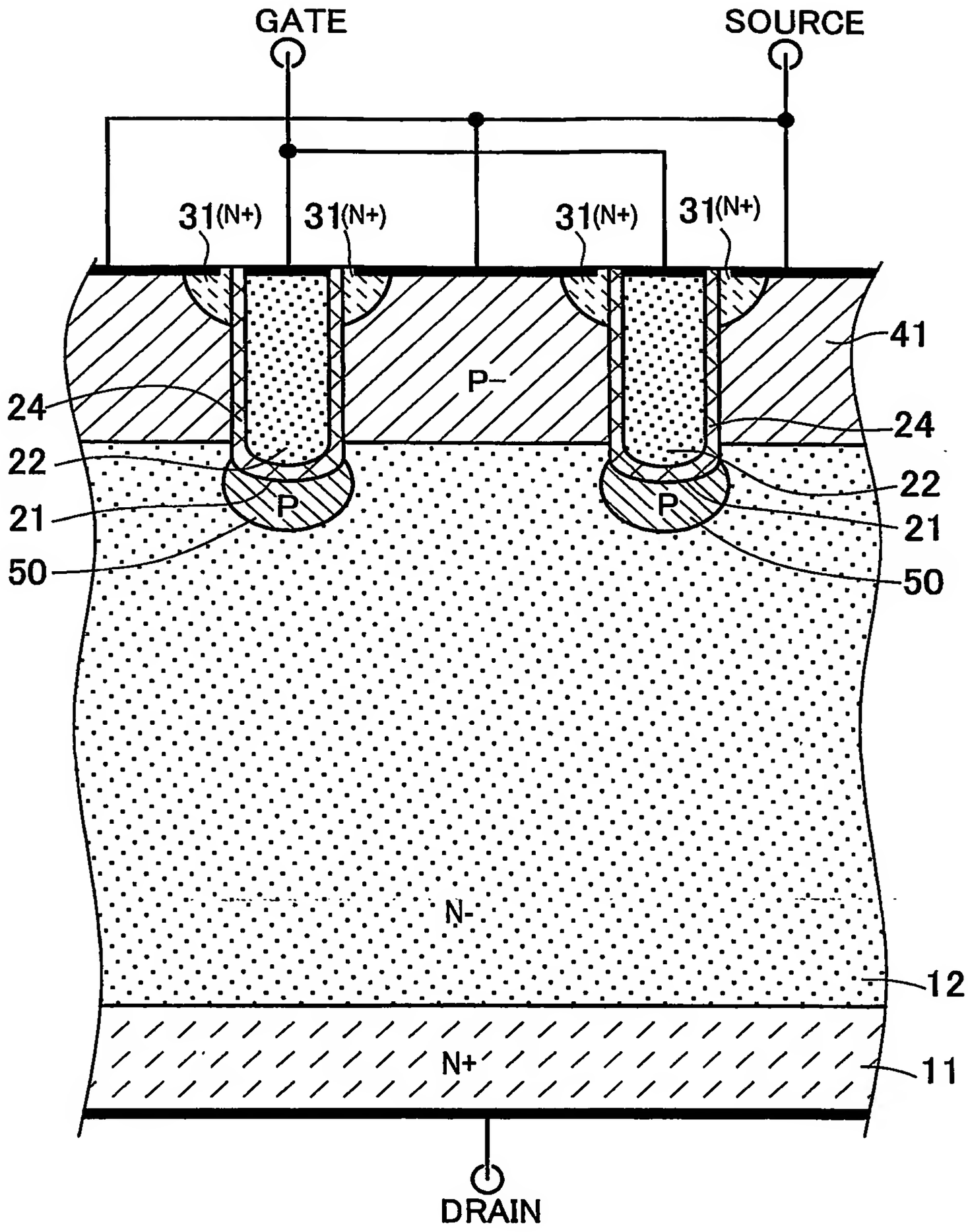

GATE
SOURCE
31(N+)
31(N+)
31(N+)
31(N+)
41
P-
24
24
22
22
P
P
21
21
50
50
N-
12
N+
11
DRAIN

FIG.31

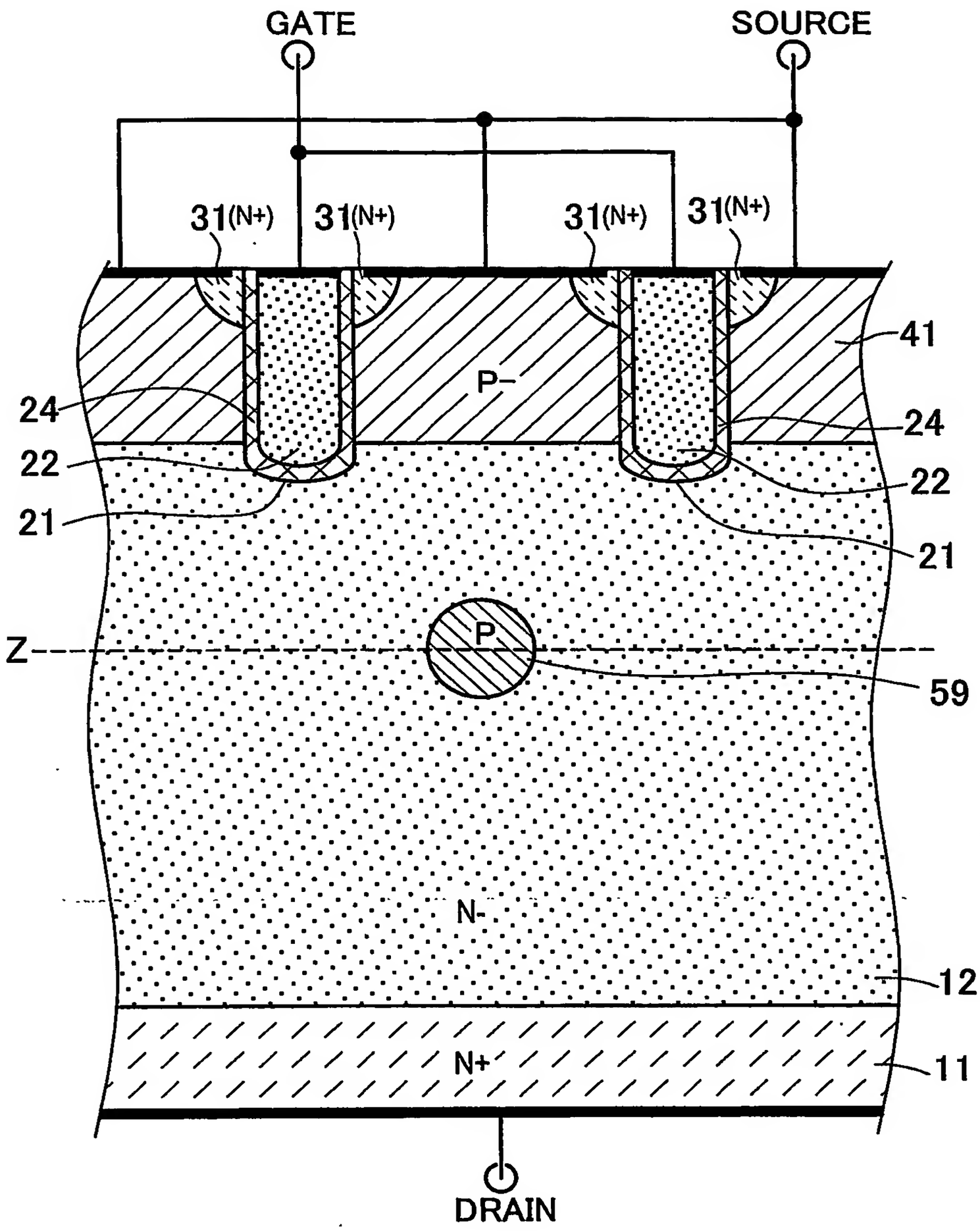
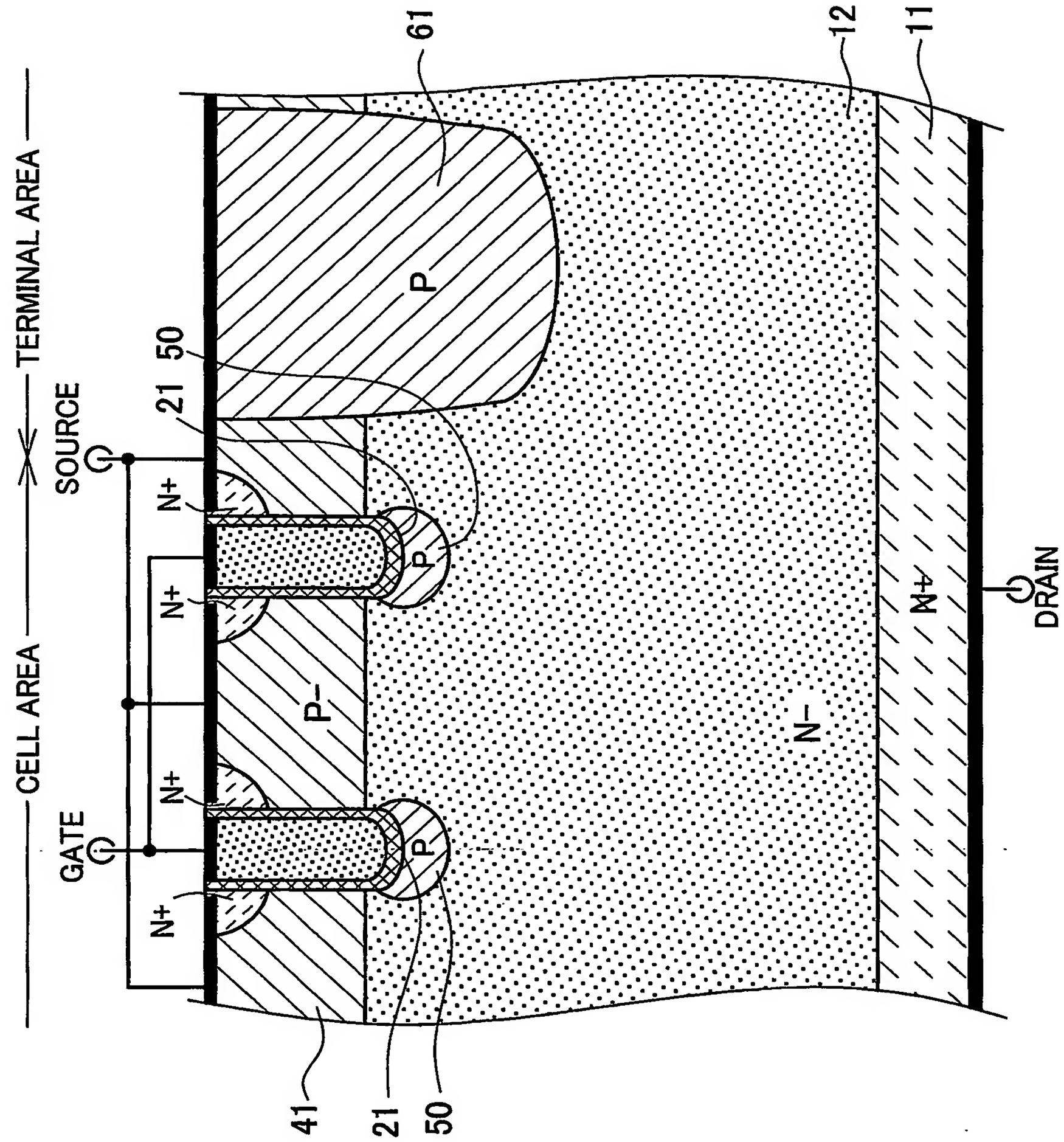

GATE
SOURCE
31(N+)
31(N+)
31(N+)
31(N+)
41
P-
24
24
22
22
21
21
P
Z
59
N-
12
N+
11
DRAIN

FIG.32


CELL AREA
TERMINAL AREA
SOURCE
GATE
DRAIN
61
12
11
21
50
41
N+
P
P-
N-
N+